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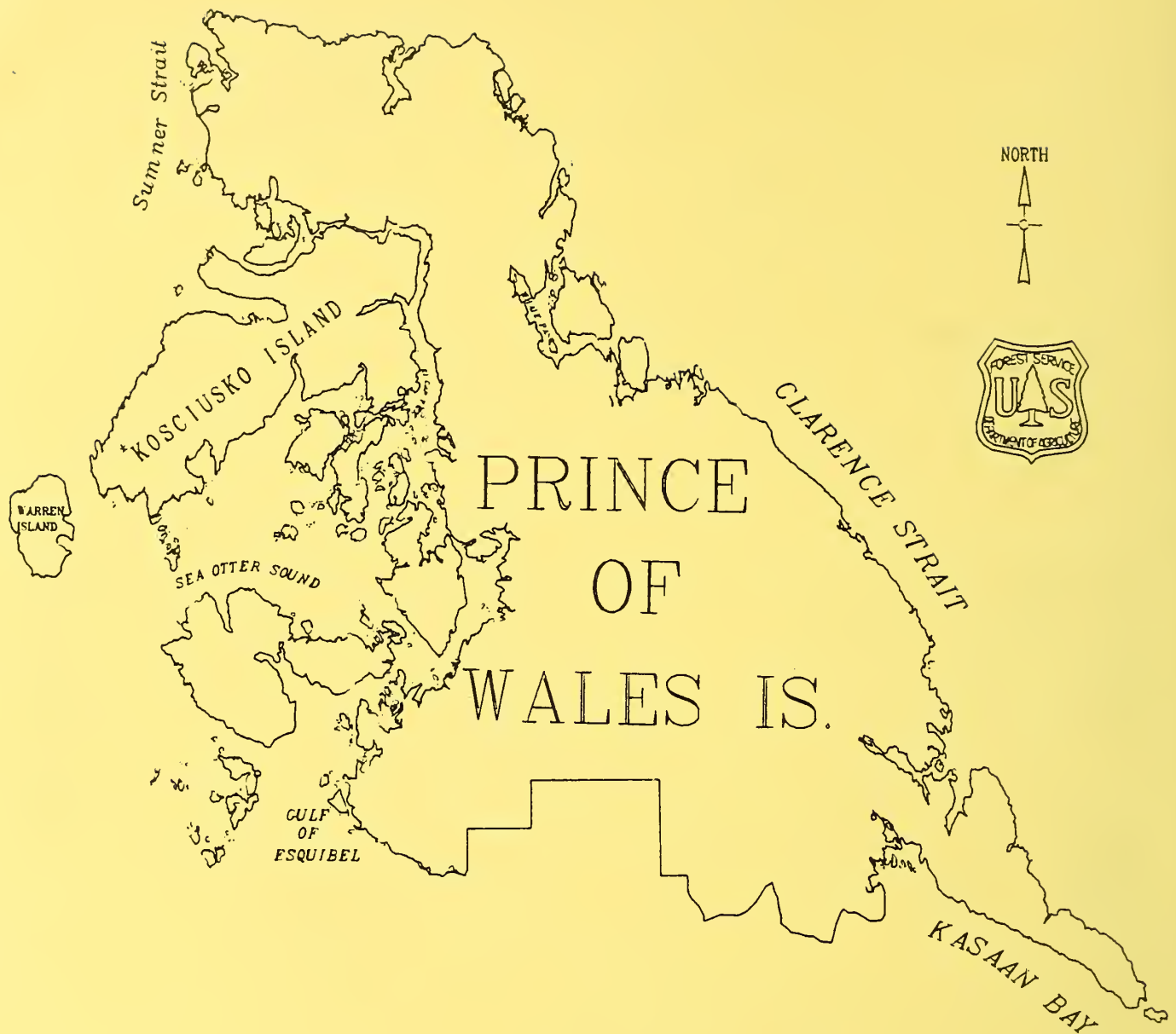
North Sea Otter Sound

Final Environmental Impact Statement

Alaska Region
Ketchikan Area

10/11/81
10/11/81
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NORTH SEA OTTER SOUND VICINITY MAP

Map 1 - 1



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North Sea Otter Sound

Final Environmental Impact Statement

Lead Agency:

U.S.D.A. - Forest Service
Tongass National Forest
Ketchikan Area
Federal Building
Ketchikan, Alaska 99901

Responsible Official:

Forest Supervisor
Ketchikan Area
Tongass National Forest
Federal Building
Ketchikan, Alaska 99901

For Further Information:

Pete Johnson
Thorne Bay District Ranger
P.O. Box 1
Thorne Bay, Alaska 99919
(907) 828-3304

ABSTRACT:

This Environmental Impact Statement discloses the environmental effects of five alternatives for managing the land and resources of the North Sea Otter Sound area. This area covers 76,054 acres on the Thorne Bay Ranger District on the Tongass National Forest.

The alternatives provide different mixes of management activities and direction resulting in different levels of outputs, goods and services. Alternatives evaluated are: Alternative 1, the "No Action" alternative; Alternative 2, which minimizes timber harvest; Alternative 3, the Citizen's alternative; Alternative 4 which emphasizes all resources; Alternative 5 which places emphasis on timber sale economics;

The Forest Supervisor of the Tongass National Forest, Ketchikan Administrative Area has chosen Alternative 4 as the preferred alternative. It fully meets the primary objective for this FEIS of providing timber harvest units which will be suitable for sale, under the Small Business set aside program to local independent logging

Summary

Introduction

North Sea Otter Sound is located off the northwest corner of Prince of Wales Island in southeast Alaska. It is composed of the Marble, Orr, El Capitan, Tuxekan Islands, and the southwest portion of Kosciusko Island, as well as numerous smaller islands. The climate is dominated by a strong maritime influence, characterized by mild, rainy weather.

The project area has some of the most productive timber-growing sites in southeast Alaska and has been extensively logged over the last 50 years. Approximately half the original old growth has been harvested. Natural regeneration in harvested areas has restocked the sites, many of which were precommercially thinned.

To support previous timber harvest activities, an extensive road network was developed, with approximately 170 miles of inventoried roads. These roads also provide access for the residents of the two major communities within the study area. Edna Bay, located on Kosciusko Island, consists of approximately 20 families, while Tokeen, located on El Capitan Island, has approximately 12 residents. Local residents use the area's resources for subsistence activities such as fishing, hunting, trapping, food gathering, firewood cutting. The major sources of employment are commercial fishing, logging, tree thinning, oyster farming, and a small resort.

The area has an abundance of wildlife, including black-tailed deer, black bear, pine marten, and bald eagle. Streams and lakes support populations of resident trout and provide habitat for anadromous fish. The offshore waters abound with species of marine fish and crab. The project area has high scenic quality and provides superb marine recreation with its intricate arrangement of islands and protected waterways.

Recently, the public requested more emphasis be placed on managing the area for fishing, sport hunting, trapping, subsistence, small-scale logging, and recreation. With an interest by small independent logging companies to establish and maintain timber harvest operations and local residents to maintain subsistence lifestyles, the need to identify areas of possible conflicts and provide standards and guidelines for resolving these conflicts becomes of paramount importance.

Purpose of the Environmental Impact Statement

This document is a final environmental impact statement (FEIS). Its primary objective is to provide timber harvest units which would be suitable for sale under the Small Business Administration set-aside program to local independent logging operators. The FEIS accomplishes its objective by:

1. Describing the environment that would be affected by the project;
2. Disclosing the significant environmental consequences of each alternative, i.e., timber harvest within the project area;
3. Responding to the issues identified in the public scoping process;
4. Identifying the Forest Service preferred alternative.

The planning record contains the detailed information used to develop this FEIS and is available for review at the Forest Supervisor's Office, Federal Building, Ketchikan, AK.

This document uses four main chapters to discuss the purpose and need for an EIS, the alternatives including the proposed action, the existing conditions of the affected environment, and the environmental consequences of the alternatives as well as measures to mitigate adverse effects.

Relationship of this FEIS to Other Planning Documents

The FEIS for North Sea Otter Sound is part of a hierarchical planning system. The sequence begins with long-range planning at the national level and continues down through the regional and forest levels to the project level. As this is a project-level analysis, its scope is confined to issues within the project area.

All alternate ways of meeting the project objectives must be consistent with land and resource allocations established in the current Forest Plan (TLMP). TLMP divided the Tongass National Forest into management areas, which are in turn subdivided into value comparison units (VCUs), roughly equivalent to major watersheds. All VCUs within the project area have been prescribed, under TLMP, to be managed under land use designation (LUD) IV, which states: "Opportunities will be provided for intensive resource use and development where emphasis is primarily on commodity or market resources. Allowances in calculated potential timber yield have been made to provide for protection of physical and biological productivity."

Responsible Official and Decision to be Made

This FEIS is not a decision document, but is written to help the deciding official select which alternative to implement. The Forest Supervisor of the Tongass National Forest, Ketchikan Area is the deciding official who must make the decision regarding the management of North Sea Otter Sound. The Supervisor can decide to: (1) select one of the alternatives analyzed within this FEIS, (2) choose a modified alternative, as long as the environmental consequences of the modified alternative are fully documented within this FEIS, or (3) reject all alternatives and order a new FEIS.

Issues and Concerns

Following review of public comments, alternatives were developed with emphasis placed on the following major issues.

Issue 1: Effects of Timber Harvest Activities on Populations of Anadromous Fish

Issue 2: Effects of Timber Harvest Activities on Populations of Species that are Dependent on Old-Growth Habitat

Issue 3: Effects of Timber Harvest Activities on Visual Quality

Issue 4: Maintenance of Existing Lifestyles

Issue 5: Protection of Subsistence Use Areas

Issue 6: Timber Sale Economics

Issue 7: Location and use of Transportation Systems and Log Transfer Facilities

Issue 8: Opportunity to Enhance Recreation Potential of Project Area

Two issues and concerns were found to be either beyond the scope of this planning effort or related to areas outside the physical boundaries of the project and will not be addressed by this FEIS. They are:

- To reduce the 450 million board feet per year harvest level.
- To cancel the long-term timber sale agreement with Ketchikan Pulp Company.

Alternatives Considered

To address the issues and comply with NEPA regulations, the Forest Service developed five alternatives for the North Sea Otter Sound FEIS.

Alternative 1

Alternative 1, the No Action option, would maintain the current levels of timber, road facilities, fish, wildlife, recreation, and visual resources, however no new activities would be scheduled. It is the baseline against which the four action alternatives are compared.

Alternative 2

Alternative 2 is based on preserving visual qualities. It proposes harvesting 28.2 million board feet (mmbf) and hauling timber to the most economical LTF. This alternative would also construct 4.5 miles of new roads, actively maintain the Cape Pole to East Edna Bay Road, and provide variable-width buffers around streams and lakes, as necessary, to protect fisheries habitat. Proposed average unit size is 44 acres.

Alternative 3

Alternative 3 was submitted by residents of North Sea Otter Sound. It emphasizes timber harvest while maintaining large streamside buffer strips to protect the habitat of anadromous fish and resident trout and seeks to maintain lifestyles and subsistence use patterns. Alternative 3 proposes to harvest 37.2 mmbf over 955 acres, use LTFs at Nichin Cove and Cape Pole, and construct about 5.0 miles of new roads. The Cape Pole to East Edna Bay Road and the Cape Pole to West Edna Bay Road would be actively maintained. This alternative proposes an average harvest unit of 33 acres and fixed-width buffers of 300 feet around Class I and 100 feet around Class II streams; 500 feet around anadromous fish lakes; and 100 feet around resident fish and water quality lakes.

Alternative 4

Alternative 4 emphasizes enhancement of local lifestyles by providing timber to sustain small local timber operations, while retaining much of the area's primitive nature. It also provides for maintenance of key wildlife and fish habitats to continue to accommodate local subsistence needs. It calls for a moderate level of visual resource protection and places primary emphasis on primitive recreation. This alternative proposes 46.2 mmbf over 1104 acres, to haul timber to LTFs at Nichin Cove or Cape Pole, and approximately 6.7 miles of new roads, with 1.1 miles of temporary road construction. The new roads, the Cape Pole to East Edna Bay Road, and the Cape Pole to West Edna Bay Road would be actively maintained. Average size of harvest unit would be 40 acres with variable-width buffers around streams and lakes.

Alternative 5

Alternative 5 places emphasis on the timber sale program and provides a range of opportunities for different sized logging operations. This alternative would result in the greatest change to the lifestyles of the local people. Alternative 5 proposes a harvest of 98.3 mmbf over 2348 acres, to haul timber to the most economical LTF, and about 18 miles of new roads. The new roads, the Cape Pole to East Edna Bay Road, the Cape Pole to West Edna Bay Road, and the East Edna Bay Road to Ruins Point would be actively maintained. The average harvest unit size would be 50 acres and variable-width buffers around streams and lakes as determined necessary to protect fisheries habitat.

Comparison of Alternatives

Issue 1

Effect of Timber Harvest on Populations of Anadromous Fish

The No Action Alternative 1 would have no additional environmental impacts. The effects of timber harvest on populations of anadromous fish proposed by the action alternatives follow: Alternative 3 proposes no timber harvest in any AHMU; Alternative 2 and 4 propose harvest in 4 AHMUs; Alternative 5 proposes harvest in 8 AHMUs. Fishery enhancement projects would be determined by inventory of streams in all action alternatives. Maximum buffer size on cutting unit boundaries adjacent to streams and lakes is proposed in Alternative 3. Alternatives 2, 4, and 5 propose variable-width buffers, based on statement of need by fishery biologist.

Issue 2

Effects of Timber Harvest Activities on Populations of Species that are Dependent on Old-Growth Habitat

Proposed acres converted to second growth vary by alternative: Alternative 2 proposes 702 acres; Alternative 3—955 acres; Alternative 4—1104 acres; and Alternative 5—2333 acres. Acres of proposed harvest of key winter range for Sitka black-tailed deer by alternative are: Alternative 2—370 acres; Alternative 3—428 acres; Alternative 4—536 acres; and Alternative 5—910 acres. Alternative 2 proposes 5931 acres of old growth be permanently prescribed for old-growth wildlife habitat; Alternative 3 proposes 5764 acres be permanently prescribed for old-growth wildlife habitat; Alternative 4—6124 acres; and Alternative 5—5392 acres.

Issue 3

Effects of Timber Harvest Activities on Visual Quality

Alternatives 2, 3, and 4 would produce only minor negative impacts. Alternative 5 proposes visual quality objectives that would reduce the foreground to modification and the middle-ground and background to maximum modification. Acres prescribed for extended rotation to preserve scenic quality are: Alternative 2—3570 acres; Alternative 3—5306 acres; Alternative 4—4607 acres; Alternative 5—2310 acres.

Issue 4

Maintenance of Existing Lifestyles

All action alternatives provide employment for loggers, wood processors, and tree thinners. The least number of truckloads estimated to pass through Edna Bay is proposed in Alternatives 3 and 4; the highest number is proposed in Alternative 5.

Issue 5

Protection of Subsistence Use Areas

Deer populations would be affected most by Alternative 5 which proposes removal of 2333 acres of old growth and 910 acres of key winter range. Alternatives 2, 4, and 5 propose variable-width buffers to protect streamcourses and lakes from timber harvest activities. Alternative 3 proposes large, fixed-width buffers.

All action alternatives would increase local runs of anadromous fish. Alternative 5 provides for 15.4 miles of new roads that could be used for subsistence activities; Alternatives 2 and 3 propose about 4 miles; Alternative 4 proposes 6.7 miles.

Issue 6

Timber Sale Economic

Alternatives 2, 3, and 4 propose intermittent small sales which are not conducive to improving the economic viability of timber offerings. Alternative 5 proposes a range of opportunities for different sized logging operations. Larger sale offerings can benefit timber sale economics.

Issue 7

Location and Use of Transportation Systems and Log Transfer Facilities

Transportation systems by alternatives: Alternative 2 proposes 4.5 miles of new roads and 3.9 miles of road reconstruction; Alternative 3 proposes 5.0 miles of new roads and 6.8 miles of road reconstruction; Alternative 4 proposes 6.7 miles of new roads and 6.8 miles of road reconstruction.

All action alternatives would improve and use LTFs at Cape Pole and Nichin Cove; Alternative 2 would additionally use Edna Bay; Alternative 5 would additionally use Edna Bay and West Orr.

All action alternatives would actively maintain the Cape Pole to East Edna Bay Road. Alternatives 3, 4, and 5 would also actively maintain the Cape Pole to West Edna Bay Road and Alternative 5 would additionally maintain the East Edna Bay to Ruins Point. In the action alternatives, all other roads would be maintained consistent with the level of commercial or administrative use; continued timber harvest would be essential to keep existing specified roads maintained or open; and existing roads would be closed as dictated by safety and budgetary constraints.

Issue 8

Opportunity to Enhance Recreation Potential

Alternatives 2, 3, and 4 would propose building a three-sided shelter at Tenass/Brockman/Marble Pass and the area would maintain its primitive character. Alternative 5 proposes a three-sided shelter built at Tenass/Brockman/Marable Pass; the area would lose some of its primitive character, as more timber harvest activities are evident.

Environmental Consequences

Chapter 4 of the document analyzes the significant physical, biological, economic, and social effects likely to result from implementation of each of the alternatives described in Chapter 2. The environmental consequences discussed in Chapter 4 respond to the issues, concerns, and opportunities presented in Chapter 1.

Issue 1

Effect of Timber Harvest Activities on Populations of Anadromous Fish

The potential project effects of the proposed alternative timber harvest plans and associated road construction plans on aquatic habitat, which includes anadromous spawning and rearing habitat, should be minimal or eliminated by the application of the Forest Service standards, guidelines, and site-specific prescriptions.

Issue 2

Effects of Timber Harvest Activities on Populations of Species that are Dependent on Old-Growth Habitat

Effects of timber harvest on wildlife and wildlife habitat vary depending on individual wildlife species requirements and the location, extent, and type of harvest. Forage and cover are the primary habitat components affected by timber harvest. Evaluation of the effects must be made in relation to changes in the availability, abundance, and distribution of these habitat components for each wildlife species over time.

Sitka Black-tailed Deer

Deer habitat capability and deer populations in the project area will be affected by timber harvest. In the long-term, timber harvest converts old-growth stands into even-aged, closed canopy stands from 25 through 100 years. The closed canopy stands intercept snow well and provide thermal cover. However, they eliminate preferred browse species and reduce habitat capability for deer.

An important way of analyzing cumulative effects on Sitka black-tailed deer is to consider the area of old-growth prescription which would remain at the end of rotation. Alternative 4 proposes the largest number of acres for old-growth prescription followed by Alternatives 2, 3, and 5.

Black Bear

Clearcutting within black bear habitat removes security cover and den sites, thereby reducing habitat capability. Clearcutting within foraging habitat creates highly productive foraging sites and increases habitat capability for about 25 years following timber harvest. After 25 years, the conifer canopy closes and forage production declines. Clearcutting reduces the number of future den trees within foraging habitats.

An important way of analyzing cumulative effects on black bear is to consider the area of old-growth prescription that would remain at the end of rotation. Alternative 4 proposes the largest number of acres for old-growth prescription followed by Alternatives 2, 3, and 5.

Pine Marten

Pine marten prefer habitat with old-growth characteristics. Timber harvest of old-growth habitats reduces pine marten habitat capability. Pine marten habitat capability and populations are assumed to decline proportionally, with the amount of old-growth habitat harvested.

An important way of analyzing cumulative effects on pine marten is to consider the areas of old-growth prescription which would remain at the end of rotation. Alternative 4 proposes the largest number of acres for old-growth prescription, followed by Alternatives 2, 3, and 5. The majority of the old-growth prescription areas are greater than 180 acres, satisfying the pine marten's effective block size requirements. Some of the old-growth prescription areas will end up being isolated, due to past and future harvesting, and will diminish future population recruitment.

River Otter

River otter generally occur in close proximity to anadromous streams, lakes, and beach fringe habitats. River otter habitat was calculated as acres of these habitats. The action alternatives propose harvest of 86-385 acres, or 1-4 percent, of river otter habitat. A portion of this habitat has been protected in the fisheries AHMU buffers and in the beach fringe old-growth prescription.

An important way of analyzing cumulative effects on river otter is to consider the area of old-growth prescription which would remain at the end of rotation. Beach fringe, an important part of river otter habitat, has been proposed for old-growth prescription. About 68 percent of the original habitat for river otter would be lost by 1990, and an additional 1-4 percent by 2000.

Bald Eagle

The bald eagle and its habitat have been given special protection through the Memorandum of Understanding and the Bald Eagle Protection Act. Bald eagle habitat was calculated as acres of beach fringe and anadromous streamside.

Removal of perch or nest trees reduces habitat capability. Long-term management of bald eagle habitat requires that alternate nest and perch sites be retained. It was determined during the formulation of alternatives and selection of harvest units that no nest would be potentially affected. Areas of old-growth prescription would provide alternate nest and perch trees within beach and estuarine habitat. Potential nest and perch trees outside these areas may be harvested during A-frame logging. The extent of impact depends on the amount of beach fringe harvested. Both bald eagle nesting habitats and seasonal concentration areas are vulnerable to disturbance.

The action alternatives schedule between 59 and 358 acres, or 1 and 4 percent of bald eagle habitat. An important way of analyzing cumulative effects on bald eagles is to consider the area of old-growth prescription that would remain at the end of rotation. Alternative 4 proposes the

largest number of acres for old-growth prescription followed by Alternatives 2, 3, and 5. Beach fringe is an important habitat for bald eagles and the location of these areas varies in the alternatives. The cumulative effect of the previous and proposed harvest of beach fringe will have a very negative effect on bald eagle habitat capability and populations.

Cavity Nesters

Cavity nesters/hairy woodpeckers prefer old-growth stands of western hemlock and Sitka spruce. Hairy woodpeckers require a continual recruitment of snags into the habitat. As a primary excavator, hairy woodpeckers provide potential nesting cavities, dens, and roosting sites for several secondary cavity nesting species.

Hairy woodpecker/cavity nester habitat was calculated as acres of operable volume classes 4-7 adjacent to streams, lakes, and estuaries. The highest density of denning and nesting occurs adjacent to streams, lakes, and estuaries. Some snags would be maintained within areas receiving fisheries prescriptions and within old-growth prescription areas. Populations could change depending upon the number of snags available for nesting.

The action alternatives schedule from 55 to 73 acres, or 4-5 percent of this habitat. An important way of analyzing cumulative effects on hairy woodpeckers is to consider the areas of old-growth prescription which would remain at the end of rotation. Alternative 4 proposes the largest number of acres for old-growth prescription followed by Alternatives 2, 3, and 5.

Early Successional Stage Species

Early successional stage species including long-tailed vole and orange crowned warbler use all habitats associated with grass-forb and seedling-sapling stage vegetation. These species benefit from timber harvest for about 20 years. Additional habitat would be created for these species along road corridors. The action alternatives schedule between 702 and 2348 acres, or 2-7 percent of their habitat.

Issue 3

Effects of Timber Harvest Activities on Visual Quality

As second-growth timber develops, the visual effects of past intensive timber harvest in Sea Otter Sound will become less visually apparent. The varying levels and locations of future timber harvest presented in the alternatives will determine whether there is a net increase or decrease in the scenic qualities of the Sound. With Alternatives 2 and 3, there would be a net increase in scenic quality as past harvest insensitive areas becomes less apparent and new units are located where they would have minor visual impact. Alternative 4 would maintain its current reduced level as past harvest in sensitive areas becomes less apparent through regrowth and new harvest units are located where they will create new visual impacts. Alternative 5 would reduce further the current level of scenic quality as concentrated harvest in visually sensitive areas outpaces regrowth in previously harvested areas, and as new, fairly extensive harvest is initiated in areas now in a natural condition.

Issue 4

Maintenance of Existing Lifestyles

Elimination or creation of jobs in one sector such as logging or fishing can result in change of opportunity or lifestyles for the other sector of the population. Reactivation of the LTF at Edna Bay is largely opposed by local residents. By not operating the LTF, job opportunities for loggers and part-time loggers may be lost.

Proposed actions, including timber harvest, road construction and LTFs, can result in direct changes to the public resource. An indirect impact that may result from project implementation involves population changes. At present, facilities and services available in the Sound include a general store at Tokeen, and a post office and school at Edna Bay. Any increase in population would likely bring additional business to the store but would not likely impact the post office as mail is typically flown in and out of each settlement. If a logging camp is reestablished at Cape

Pole, there is potential for impact on the Edna Bay School. Edna Bay residents prefer not to reactivate the LTF in the bay for health and safety reasons as well as aesthetic reasons.

Issue 5

Protection of Subsistence Use Areas

Many residents of North Sea Otter Sound depend on natural resources for subsistence purposes to supplement limited seasonal incomes and provide needed food. Timber harvest has the potential to impact both stream and upland habitats critical to important subsistence species including salmon, deer, bear, and furbearers, specifically marten. Impacts would generally be short-term and, depending on scheduling and location of harvest, could create diversity in the remaining old-growth which could improve habitats for some second-growth dependent species. Roads can provide subsistence users access to otherwise inaccessible areas, thus increasing their opportunities. However, roads can result in increased competition for wild resources from non-rural residents. This could result in a decline of local subsistence species and subsequent restrictive regulations.

Building logging camps near other subsistence communities can result in increased competition for subsistence resources.

Most of the impacts to marine habitats from logging are associated with LTFs. The sloughing of bark from logs dumped into marine waters can result in the reduction of habitat critical for important subsistence species including crab. The physical disturbances of noise, equipment, people, etc, can modify the use of the surrounding habitat by deer, bear, furbearers, and waterfowl. Bays with high wildlife use can be expected to have greater potential for impact than a bay with lower use. There are no new LTF sites proposed for construction with this EIS. The LTFs at Nichin Cove, West Orr Island, Cape Pole, or East Edna Bay may be reactivated. Of these, only Edna Bay is used for subsistence clamming and crabbing.

Issue 6

Timber Sale Economics

All VCUs within the NSOS area are designated as Land Use Designation (LUD IV) under the current Forest Plan (TLMP). TLMP gives management direction to Management Area K05, VCUs 543, 544, 545, and 546, for second-growth management and timber harvest of old-growth while protecting subsistence and fisheries values. Special emphasis is to be placed on subsistence. TLMP management emphasis for VCUs 556, 557, 560, and 587 is on taking advantage of highly productive timber-growing sites while protecting key recreation, fish, and wildlife values. TLMP management emphasis for VCU 555 is to continue timber harvest at moderate levels while protecting subsistence values.

Issue 7

Location and Use of Transportation Systems and Log Transfer Facilities

The existing transportation system is extensive, especially on Kosciusko and Tuxekan Islands. New roads will need to be constructed to access proposed timber units. Sections of existing roads will need to be reconstructed to be in suitable condition for hauling timber. Several bridges will need replacement, either because they have deteriorated or because they have been removed to be used elsewhere. None of the inactive LTFs within the project area are suitable for use in their current condition. Some form of reconstruction will be necessary.

Issue 8

Opportunity to Enhance Recreation Potential of Project Area

A change in recreation opportunities occurred on about 70 percent of the study area from primitive activities in a natural setting to more developed, roaded recreation opportunities in a modified setting. This was a result of past timber practices, such as construction of an extensive road system, and a pattern of timber harvest within the study area.

Alternatives 2, 3, and 4 would result in little change to the existing Recreation Opportunity Spectrum because roads and harvest units are located within areas that are currently heavily

modified. Alternative 5 would result in changes in the Recreation Opportunity Spectrum from Semi-Primitive to Roaded Modified on about 800 acres in the Mt. Francis and Marble Passage area. It is expected that recreation use, especially marine-oriented activities, will continue to grow steadily.

Preferred Alternative

After evaluating the benefits and impacts of each alternative against the issues, the Forest Supervisor of the Tongass National Forest, Ketchikan Administrative Area, has chosen Alternative 4 as the preferred alternative. It fully meets the primary objective for this FEIS, that of providing timber harvest units which will be suitable for sale to local independent logging operators under the Small Business set-aside program.

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Chapter 1

Purpose of and Need for Action

Chapter 1

Purpose of and Need for Action

Purpose of the Project

The USDA Forest Service is developing a timber harvest project analysis for the North Sea Otter Sound area. The 76,000 acre project area is located in southeast Alaska on the Tongass National Forest, Ketchikan Administrative Area. It includes the southern portion of Kosciusko and Marble Islands, Orr, Tuxekan, Cap, El Capitan, as well as other smaller islands (see Map 1-1).

The purpose of the project analysis is to define timber harvest activities within the North Sea Otter Sound area for the next ten years. All prescribed timber harvests will be recommended for inclusion in the Small Business Administration (SBA) set-aside sale program on the Tongass National Forest, Ketchikan Administrative Area.

Specifically, this project analysis will define:

1. Location of timber harvest units;
2. Location of wildlife retention and visual extended rotation areas;
3. The type and location of recreation facilities;
4. Fish, wildlife, and recreation enhancement opportunities;
5. Transportation systems to be developed;
6. The location of log transfer facilities (LTFs) where logs are transferred from land to water.

In addition to specific project locations, standards to guide project implementation are defined.

Purpose of the Environmental Impact Statement

This document is a final environmental impact statement (FEIS). Its primary objective is to provide timber harvest units, of a salvage nature, which would be suitable for sale under the Small Business Administration set-aside program, to local independent logging operators. The FEIS accomplishes its objective by:

1. Describing the environment that would be affected by the project;
2. Disclosing the significant environmental consequences of each alternative which meet the stated objective, i.e., timber harvest within the project area;
3. Responding to the issues identified in the public scoping process;
4. Identifying the Forest Service preferred alternative.

The planning record contains the detailed information used to develop this FEIS. Because the planning records are too voluminous to include within this document, they are incorporated by reference at appropriate points within the text of this document. The planning record for this project is available for review at the Forest Supervisor's Office, Federal Building, Ketchikan, AK.

Background

The project area has been used intensively for timber harvest since the 1940s. Recently, the public has requested that more emphasis be placed on managing the area for fishing, sport hunting, trapping, subsistence, small-scale logging, and recreation. With an interest by small independent logging companies to establish and maintain timber harvest operations and by local residents to maintain subsistence lifestyles, the need to identify areas of possible conflicts and provide standards and guidelines for resolving these conflicts becomes of paramount importance.

Relationship of this FEIS to Other Planning Documents

The FEIS for North Sea Otter Sound is part of a hierarchical planning system. The sequence begins with long-range planning at the national level and continues down through the regional and forest levels to the project level. As this is a project level analysis, its scope is confined to issues within the project area, i.e., it does not attempt to refute decisions made in the following higher level plans:

- National Level - the 1990 Program and Assessment as directed by The Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA).
- Regional Level - the Alaska Regional Guide (1983).
- Forest Level - the Tongass Land Management Plan (TLMP), adopted in 1979 and amended in 1986.

TLMP divided the Tongass National Forest into management areas, which are in turn subdivided into value comparison units (VCUs), roughly equivalent to major watersheds. All VCUs within the project area have been prescribed, under the current Forest Plan (TLMP), to be managed under land use designation (LUD) IV, which states:

“Opportunities will be provided for intensive resource use and development where emphasis is primarily on commodity or market resources. Allowances in calculated potential timber yield have been made to provide for protection of physical and biological productivity.”

All alternate ways of meeting the project objectives must be consistent with land and resource allocations established in TLMP. The following table displays the management areas within the project area, as well as the VCUs and corresponding acres.

Table 1 - 1

Management Areas and VCUs

Management Area	VCU	Acres
K04	555	13,889
K05	543	16,009
	544	7,080
	545	6,751
	546	11,191
K07	556	6,250
	557	4,200
	560	5,902
	587	4,500

Responsible Official and Decision to be Made

This FEIS is not a decision document, but is written to help the deciding official select which alternative to implement. The Forest Supervisor of the Tongass National Forest, Ketchikan Area is the deciding official who must make the decision regarding the management of North Sea Otter Sound. The Supervisor can decide to: (1) select one of the alternatives analyzed within this FEIS, (2) choose a modified alternative, as long as the environmental consequences of the modified alternative are fully documented within this FEIS, or (3) reject all alternatives and order a new FEIS.

Public Involvement

Alternatives were formulated around the identification of major issues. Major issues were initially identified by Forest Service personnel, with input from State and other Federal agencies. The public and special interest groups were then asked to comment on the initial list of issues through the processes outlined below.

1. **Public Mailing** - On March 21, 1986, a scoping packet was distributed to approximately 60 individuals and organization representatives. The packet contained a background paper and a letter requesting public concerns about the project.
2. **Local News Media** - Announcements about the project were printed in the Ketchikan Daily News and the Island News, March 17, 1986.

3. Notice of Intent to Prepare an Environmental Impact Statement - A Notice of Intent was published in the Federal Register, April 3, 1986 when it was decided that an EIS was to be completed for the project.
4. Local Meetings - Meetings were held at Edna Bay, Port Alice, Naukati, Nichen Cove, and Token to involve interested parties and ensure identification of local concerns.
5. Individual Contacts - More than 35 personal contacts have been made with area residents to inform them of the project and to document their concerns.

Copies of the legal notices and newspaper articles are included in the planning records located at the Forest Supervisor's Office, Federal Building, Ketchikan, AK.

Issues and Concerns Outside the Scope of this FEIS

Following review of all public comments, some issues and concerns were found to be either beyond the scope of this planning effort or related to areas outside the physical boundaries of the project. These issues, which will not be addressed by this FEIS, are:

Reduce the 450 Million Board Feet per Year Harvest Level.

This issue is not being addressed because this FEIS is for only part of the Tongass National Forest. The decision to set the allowable sale quantity levels for the Tongass National Forest must be addressed in the overall Forest Plan which establishes forest-wide resource objectives.

Cancel the Long Term Timber Sale Agreement With Ketchikan Pulp Company.

Cancellation of the long-term timber sale contract by the Forest Service would have to be based upon serious and continued violation of contract terms, conviction of violating criminal statutes, or final administrative or judicial determination of violation of legal requirements for protection of environmental quality by KPC (see 36 CFR 223.116(a)(i)(4)). The Forest Service and the Department of Justice have determined that none of these conditions exist.

Issues and Concerns Within the Scope of this FEIS

Following review of public comment, the initial list of issues was amended to reflect public concerns. Alternatives were developed with emphasis placed on the major issues listed below.

Issue 1

Effect of Timber Harvest Activities on Populations of Anadromous Fish

Fish resources are important to Sea Otter Sound area residents for commercial, subsistence, and/or recreational reasons.

Public responses regarding fish resources indicated that some feel buffer zones should be established along streams and that certain streams be given special consideration.

Issue 2

Effects of Timber Harvest Activities on Populations of Species that are Dependent on Old-Growth Habitat.

Wildlife resources are important to Sea Otter Sound area residents for commercial, subsistence, and/or recreational reasons.

Some public responses indicated that harvest unit size should be reduced and that an appropriate mix of old growth and second growth stands be maintained. It was suggested that partial cutting be used as a harvest method.

Issue 3

Effects of Timber Harvest Activities on Visual Quality

Sea Otter Sound has high scenic quality and potential for marine recreation with its intricate arrangement of islands and protected waterways.

Public responses indicated that inventoried Visual Quality Objectives established by the visual resource inventory be met and the primitive character of the Tenass, Brockman and Marble Pass areas be retained.

Issue 4

Maintenance of Existing Lifestyles

Sea Otter Sound residents indicate they live in the area for many reasons. They believe their remote communities are a better place to raise their families, are less expensive places to live, and offer solitude.

Maintenance of these lifestyle components is extremely important to Sea Otter Sound area residents although many respondents expressed a belief that conflicts were inherent among the diverse user groups inhabiting the local area. Loggers, tree thinners, and fisherpeople felt that the others adversely affected their lifestyle and/or the local environment.

Issue 5

Protection of Subsistence Areas

Given the cyclic and seasonal nature of both commercial fishing and timber harvest, fish, wildlife, and other natural resources are harvested by some to supplement personal income and to provide needed food. Others choose to participate in subsistence activities as they provide a healthier source of food. Whether by necessity or choice, subsistence hunting, fishing, trapping, and gathering are important for community livelihood.

Protection of subsistence use areas is important to Sea Otter Sound residents for personal as well as economic reasons. Area residents suggested that no timber be harvested in or directly adjacent to these areas.

Issue 6

Timber Sale Economics

In the past, severely depressed timber markets have made some timber sales (or individual units within sales) uneconomical to harvest. There was a general feeling among those who raised this issue that various measures should be taken by the Forest Service to improve the economic viability of timber sales, despite historical fluctuations of the timber market.

Suggested measures included reducing the overall amount of road building and environmental standards to reduce costs and to provide more harvest in high volume stands.

Issue 7

Location and Use of Transportation Systems and Log Transfer Facilities

Roading can affect communities and resident's lifestyles and can make long-term changes in recreation and subsistence opportunities.

Public concerns indicated that roads need to be managed to lessen impacts to fish, wildlife and dispersed recreation resources and that new construction associated with timber harvest be minimized. They also felt that road maintenance should continue even if timber harvest did not occur. It was also suggested that the Forest Service maximize use of existing log transfer facilities (LTFs) rather than constructing new ones. An exception was the existing East Edna Bay LTF, which Edna Bay residents did not want reactivated.

Opportunity to Enhance Recreation Potential of Project Area

Currently the project area is managed primarily for primitive recreation. There was only limited discussion that slightly more intensive recreation sites be developed.

Approval Required from Other Agencies

☐ U.S. Army Corps of Engineers

The Department of the Army, acting through the Corps of Engineers, is responsible for administering federal laws that regulate activities in specific waters of the United States, including oceans. The authorities for these programs are based on Sections 9 and 10 of the River and Harbor Act of 1899 and Section 404 of the Clean Water Act.

The Forest Service is required to obtain an individual or general Section 404 permit for certain proposed activities such as placement of fill for LTFs. Floating camps, docks and log rafting also require a permit under Section 10 of the River and Harbor Act of 1899 for all structures or work in or affecting navigable waters of the United States.

☐ Environmental Protection Agency

Section 402 of Public Law 92-500 Clean Water Act requires a valid National Pollutant Discharge Elimination System permit for any discharge of pollutants to the waters of the United States. Permits must be obtained prior to the discharge of any pollutants. In addition, a review of the Spill Prevention Control and Countermeasure Plan must be conducted.

☐ State of Alaska - Department of Natural Resources

The State of Alaska is empowered with the jurisdiction, right, and title to lands, improvements, and natural resources that are permanently or periodically covered by tidal waters up to the line of mean high tide and seaward to a line three geographical miles distant from the coast line. Any activity or structure which encroaches on State tideland requires a State tideland easement or permit. The Forest Service will apply for and hold long term easements for such structures and activities as camp docks, loading ramps, LTFs, floating camps, log storage areas, etc. Permits for short-term water access will be obtained by those conducting the activity.

☐ State of Alaska - Department of Environmental Conservation

This agency will require a certification of compliance with Alaska Water Quality Standards (401 Certification) and a solid waste disposal permit.

Coastal Zone Management

The Coastal Management Act of 1976 excludes Federal Lands from the Coastal Zone. However the Act requires that when Federal agencies conduct activities or undertake development that they be consistent to the maximum extent practicable with the approved State Coastal Management Program.

The Alaska Coastal Management Plan (ACMP) incorporated the Alaska Forest Resources and Practices Act of 1979 as the applied standards and guidelines for timber harvesting and processing. All alternate ways of meeting project objectives, Forest Service standards and guidelines, and mitigation measures described in Chapter 2 of this document are fully consistent with the State Standards.

Encumbrances

There are three areas within the project area proposed for State selection, as authorized under ANILCA. One parcel is located adjacent to the community of Edna bay and the others are on Tuxekan Island, in the Istku and Kwati Points areas.

1. Harvest Unit 546-6 of Alternative 5 lies partially within the proposed Edna Bay selection area. New road construction is planned to access this harvest unit.
2. Harvest Unit 557-1 of Alternatives 3, 4, and 5 lies on the border of the proposed Kwati Point State Selection. This selection, if consummated, will engulf approximately half of the proposed unit.
3. Harvest Unit 557-4 of Alternative 3 lies within the proposed Istku Point State selection. This selection, if consummated, will involve the total harvest unit.
4. An additional encumbrance is associated with private lands within and adjacent to the Cape Pole log transfer facility. Approximately one quarter of the existing log transfer facility is privately owned. This will require either modification of the the existing facility or purchase or lease of the privately owned portion.

Chapter 2

Alternatives Including the Proposed Action

Chapter 2

Alternatives Including the Proposed Action

This chapter describes alternative ways of meeting project objectives and the impacts of implementing those alternatives.

Process Used to Formulate Alternatives

Alternatives were developed after completion of the scoping process and are designed to address public issues, concerns, and opportunities. In addition, the local public and interest groups were encouraged to develop a "citizens' alternative". Alternatives were formulated under the guidelines that they must:

- ☐ Address the issues identified during scoping. This ensures that impacts to interests of citizens, groups, and organizations are considered in the alternatives.
- ☐ Provide a reasonable range of solutions to the issues associated with the project (listed in Chapter 1).
- ☐ Keep levels of resource outputs within the capability of the project area to produce this level on a sustained basis.

Alternatives Considered but Eliminated from Detailed Evaluation

Maximize Timber

One alternative was examined, but not considered for detailed study in this FEIS.

This alternative focused on single-purposed resource management, i.e., maximizing timber outputs, and addresses only Issues 6 and 7. Maximization of timber harvest would focus on harvesting virtually all remaining high volume old-growth stands. This could result in adverse impact to the fisheries resource due to the number of stream crossings and harvest activities in the riparian zone (Issue 1). Because it would not allow for a full range of wildlife habitat (depletion of old-growth habitat), protection of key scenic viewsheds, and primitive recreation areas, it was non-responsive to Issues 2, 3, and 8. As liquidation of old growth would alter local lifestyles and change subsistence use patterns, this alternative is non-responsive to Issues 4 and 5. For these reasons, this alternative was eliminated.

Alternatives Selected for Detailed Evaluation

The following alternatives were selected for evaluation. Although each addresses at least some of the issues outlined in Chapter 1, not all alternatives respond equally to each issue.

2 Alternatives

Alternative 1 No Action

Description

This alternative will have no scheduled timber harvest, no new road construction, no long term road maintenance, no recreation development, and no habitat enhancement projects for fish and wildlife. Current levels of timber, road facilities, fish, wildlife, recreation, and visual resources will be maintained. Only incidental activities, such as issuing free use permits and cooperation with State and Borough governments, private groups, and individuals regarding land ownership concerns, would continue.

The following table, Table 2-1, more fully quantifies the outputs and impacts of this alternative.

Table 2 - 1

Outputs and Impacts for Alternative 1

VCU	Proposed Harvest		New Road Construction	Old-growth Prescription	Extended Rotation	AHMUs Entered for Harvest
	<i>Acres</i>	<i>MMBF</i>	<i>Miles</i>	<i>Acres</i>	<i>Acres</i>	<i>Number</i>
543	0	0	0	0	0	0
544	0	0	0	0	0	0
545	0	0	0	0	0	0
546	0	0	0	0	0	0
555	0	0	0	0	0	0
556	0	0	0	0	0	0
557	0	0	0	0	0	0
560	0	0	0	0	0	0
587	0	0	0	0	0	0

Alternative Development Guidelines

This alternative was developed in response to CEQ 1502.14(d) which states “include the alternative of no action.” It serves as the baseline against which all other alternatives will be evaluated for increased outputs or departure from current resource levels. The following section documents the development of Alternative 1 in relation to the issues, concerns, and opportunities identified in Chapter 1.

Issues

Issue 1 Effect of timber harvest on populations of anadromous fish

- No population estimates are available, but area supports significant populations of salmon and trout species.
- There are 339 acres of lakes, 254 acres of which are anadromous.
- There are 83 miles of streams, 42 miles of which are anadromous; 16 miles of streams have been logged on both sides, 8 of which are anadromous; 6 miles of streams have been logged on one side, 4 of which are anadromous.
- This alternative does not authorize additional timber harvest. Consequently, there will be no additional impacts to anadromous fish populations from any form of logging operations adjacent to streams or lakes.
- There are no proposed stream or lake surveys which could assess reparable damage done to anadromous fish habitat by previous timber harvest activities. There are no habitat enhancement projects authorized.

Issue 2 Effects of timber harvest activities on old-growth dependent wildlife species

- Sitka black-tailed deer, black bear, marten, mink, and otter are primary game and subsistence species. Population levels are unknown.
- Within the project area, there are currently 31,939 acres of old growth remaining. None of this will be prescribed for permanent classification as wildlife old-growth habitat.
- Approximately 24,037 acres or 49 percent of key winter range for deer have been previously harvested and converted to second growth. This alternative will not prescribe further second growth conversions.

Issue 3 Effects of timber harvest activities on visual quality

- The project area is rich in scenic value with a complex arrangement of open ocean, protected waters, islands, bays, and passages.
- While recent clearcuts on Tuxekan and Marble Islands are visible from marine travel routes, Tenass and Brockman Pass are relatively undisturbed.
- Because no timber harvest units are proposed, there will be no modification of existing visual quality.

Issue 4 Maintenance of existing lifestyles

- Because no timber harvesting is authorized, local loggers and wood processors will have to travel elsewhere to obtain timber to harvest.
- Tree thinners may run out of potential thinning acreage in existing second growth units.
- Others not involved in these occupations will find no disruption to their current lifestyle.

Issue 5 Protection of subsistence use areas

- The lack of management activities will limit both good and bad effects on wildlife and fish habitats, e.g. no fish enhancement will be done.
- Fish and wildlife populations will rise and fall due to natural events and human predation.
- No new roads will be developed to provide access to new areas for subsistence use. Road maintenance on existing roads will decline because no timber harvest is planned.

Issue 6 Timber sale economics

- Much of remaining old growth is composed of relatively high volume, high value timber.
- Because no timber harvest is authorized, this issue is not addressed.

Issue 7 Location and use of transportation systems and log transfer facilities

- There will be no new roads built.
- Because activities such as timber harvest or habitat enhancement and rehabilitation are the sole means for an active road maintenance program, no road maintenance would be scheduled, possibly resulting in some road closures. While there would be no direct effort to close these roads, such action would be taken if roads or structures deteriorated to the point that public safety and resource protection could not be met without maintenance or reconstruction.
- No log transfer facilities will be developed.

Issue 8 Opportunity to enhance recreation potential

- The area has high scenic value, rich marine fisheries, and well protected small boat waterways and anchorages.

2 Alternatives

- There are no developed sites within the project area, but two Forest Service recreation cabins are located nearby. There are numerous undeveloped sites used by local inhabitants.
- No new recreation sites will be developed.

Alternative 2 Minimum Timber Harvest

Description

Alternative 2 is based on preserving visual qualities, i.e., scenic values, natural to the area and minimal disturbance to historical lifestyle and subsistence use by local individuals. It provides for a modest timber harvest level to provide benefit to the local economy. It emphasizes using less visible and more widely dispersed harvest units. This alternative provides for:

1. The harvest of 28.2 million board feet (mmbf) mostly sold as intermittent small sales to local operators.
2. Timber would be hauled to the most economical LTF—Nichin Cove, Edna Bay, or Cape Pole.
3. Approximately 4.5 miles of new road construction.
4. The Cape Pole to East Edna Bay road will be actively maintained; all other roads will be maintained consistent with the level of commercial or administrative use.
5. Average unit size of 44 acres.
6. Variable-width buffers around streams and lakes as determined necessary to protect fisheries habitat.

The following table, Table 2-2, more fully quantifies the outputs and impacts of this alternative.

Table 2 - 2

Outputs and Impacts for Alternative 2

VCU	Proposed Harvest		New Road Construction	Old-growth Prescription	Extended Rotation	AHMUs Entered for Harvest
	<i>Acres</i>	<i>MMBF</i>	<i>Miles</i>	<i>Acres</i>	<i>Acres</i>	<i>Number</i>
543	25	1.25	0.5	971	1292	0
544	166	4.81	1.1	331	238	1
545	75	3.34	0.1	0	0	0
546	193	7.79	1.8	649	442	2
555	27	0.68	0	1500	272	0
556	71	3.55	0.2	238	204	1
557	15	0.00	0	448	204	0
560	85	3.88	0.6	1392	68	0
587	45	2.25	0.2	402	850	0
Total	702	27.55	4.5	5931	3570	4

Alternative Development Guidelines

This alternative was developed in response to concerns regarding the effects of timber harvest, roads, and log transfer facilities on fish, wildlife, visual quality and subsistence opportunities. The following section documents the development of Alternative 2 in relation to the issues, concerns, and opportunities identified in Chapter 1:

Issues

Issue 1 Effect of timber harvest on populations of anadromous fish

Harvest will occur in 4 AHMUs. Harvest will occur to the prescribed buffer along: 5200 feet of Class I streams, 12,000 feet of Class II streams, and 2000 feet in an estuary. This will negatively influence fish populations.

- Buffers will be of variable width as determined necessary to protect fisheries habitats
- Fish habitat in the project area will be surveyed to determine the current habitat condition and to identify potential enhancement opportunities. An aquatic habitat plan will be developed, based on the collected data, with a particular emphasis on riparian enhancement.

Issue 2 Effects of timber harvest activities on old-growth dependent wildlife species

- Approximately 5931 acres will be prescribed for permanent classification as wildlife old-growth habitat.
- Approximately 370 acres (2.2 percent) of existing key black-tailed deer habitat will be harvested and converted to second growth.

Issue 3 Effects of timber harvest activities on visual quality

- Approximately 3570 acres will be allocated to extended rotation.
- Visual resources will receive minor impacts.

Issue 4 Maintenance of existing lifestyles

- This alternative proposes an annual timber harvest of approximately 2.8 mmbf, which will be available to provide employment for local loggers and wood processors.
- During the next decade, this alternative will provide 702 acres for potential employment for tree thinners.
- Others not involved in these occupations will find no disruption to their current lifestyle.

Issue 5 Protection of subsistence use areas

- Deer populations will be adversely affected by the loss of 702 acres of old-growth habitat and 370 acres of key winter range.
- Fish populations will benefit from habitat enhancement projects. There may be loss of habitat capability due to timber harvest activities.
- Approximately 4.5 miles of new roads will be developed which can provide access to new areas for subsistence usage. Continued timber haul will necessitate keeping road systems open which might be closed otherwise.

Issue 6 Timber sale economics

- Approximately 95 percent of harvest volume will be cable yarded with truck haul; remainder will be designed for A-frame system.
- The intermittent small sales proposed by this alternative would not help to improve the economic viability of timber offerings.

Issue 7 Location and use of transportation systems and log transfer facilities

- There will be 4.5 miles of new roads built; all of these roads will remain open after harvest activities.

2 Alternatives

- There will 3.9 miles of road reconstruction to prepare existing roads for timber haul.
- New roads and the Cape Pole to East Edna Bay road will be actively maintained for duration of a specific activity and maintenance levels would be consistent with levels of use. Activities such as timber harvest or habitat enhancement and rehabilitation would be the sole means for an active road maintenance program. No other maintenance would be scheduled, possibly resulting in some road closures. While there would be no direct effort to close these roads, other than that previously discussed, such action would be taken if roads or structures deteriorated to the point that public safety and resource protection could not be met without maintenance or reconstruction.
- Log transfer facilities will be developed at Nichin Cove, Edna Bay, and Cape Pole.

Issue 8 Opportunity to enhance recreation potential

- A three-sided shelter will be constructed at Tenass/Brockman/Marble Pass.
- Primitive character of all areas will be maintained.

Alternative 3 Citizens Alternative

Description

This alternative was submitted by some residents of North Sea Otter Sound in direct response to their issues and concerns. It emphasizes timber harvest while maintaining large streamside buffer strips to protect the habitat of anadromous fish, as well as resident trout. It seeks to maintain historical local lifestyles and subsistence use patterns, while providing sufficient timber harvest to stimulate the local economy. This alternative provides for:

1. The harvest of 37.2 mmbf over 955 acres.
2. The use of LTFs at Nichin Cove and Cape Pole. A logging camp would not be placed at Edna Bay, nor would its LTF be used.
3. Approximately 5.0 miles of new road construction; these roads will remain open after harvest activities.
4. The Cape Pole to East Edna Bay road and the Cape Pole to West Edna Bay road will be actively maintained; all other roads will be maintained consistent with the level of commercial or administrative use.
5. An average harvest unit size of 33 acres.
6. Fixed width buffers of 300 feet around Class I and 100 feet around Class II streams; buffers of 500 feet around anadromous fish lakes and 100 feet around resident fish and water quality lakes.

The following table, Table 2-3, more fully quantifies the outputs and impacts of this alternative.

Alternative Development Guidelines

Development of this alternative was based on a strong program of visual resource management and the retention of the primitive nature of the important recreation areas. It insists on considerable precaution to protect key wildlife and fish habitats to ensure there is no disruption of subsistence use. It was also designed to enhance the lifestyle of the local inhabitants by combining the economy boost of a modest timber program with preservation of the area's primitive character. The following section documents the development of Alternative 3 in relation to the issues, concerns, and opportunities identified in Chapter 1.

Table 2 - 3

Outputs and Impacts for Alternative 3

VCU	Proposed Harvest		New Road Construction	Old-growth Prescription	Extended Rotation	AHMUs Entered for Harvest
	<i>Acres</i>	<i>MMBF</i>	<i>Miles</i>	<i>Acres</i>	<i>Acres</i>	<i>Number</i>
543	180	8.00	1.5	815	1813	0
544	154	4.51	1.1	0	1105	0
545	0	0.00	0	407	0	0
546	79	3.16	0.2	1619	0	0
555	91	2.44	0	1127	354	0
556	92	4.08	0.2	567	575	0
557	118	4.32	0.7	478	44	0
560	173	7.30	0.8	610	133	0
587	68	2.82	0.5	141	1282	0
Total	955	36.64	5.0	5764	5306	0

Issues

Issue 1 Effect of timber harvest on populations of anadromous fish

- Because timber harvest will not occur in any designated AHMU, there will be little potential for degradation of fisheries habitat.
- Buffers will be a fixed width of 300 feet adjacent to Class I streams and 100 feet adjacent to Class II streams. Buffers will be 500 feet adjacent to anadromous fish lakes and 100 feet adjacent to water quality lakes. These buffers will probably be sufficient to mitigate potential damage from timber harvest operations.
- Fish habitat in the project area will be surveyed to determine the current habitat condition and to identify potential enhancement opportunities. An aquatic habitat plan will be developed, based on the collected data, with a particular emphasis on riparian enhancement.

Issue 2 Effects of timber harvest activities on old-growth dependent wildlife species

- Approximately 5764 acres will be prescribed for permanent classification as wildlife old-growth habitat
- Approximately 428 acres or 2.6 percent of key winter range for black-tailed deer will be harvested and converted to second growth.

Issue 3 Effects of timber harvest activities on visual quality

- Approximately 5306 acres will be allocated to extended rotation.
- Visual resources will receive minor impacts.

Issue 4 Maintenance of existing lifestyles

- This alternative proposes an annual timber harvest of approximately 3.7 mmbf, which will be available to provide employment for local loggers and wood processors.
- During the next decade, this alternative will provide 955 acres for potential employment for tree thinners
- Others not involved in these occupations will find no disruption to their current lifestyle.

2 Alternatives

Issue 5 Protection of subsistence use areas

- Deer populations will be adversely affected by the loss of 955 acres of old-growth habitat and 428 acres of key winter range.
- Fish populations will benefit from habitat enhancement projects. There will be little potential for loss of habitat capability due to timber harvest activities.
- Approximately 4.3 miles of new roads will be developed which can provide access to new areas for subsistence useage. Continued timber haul will necessitate keeping open road system which might be closed otherwise.

Issue 6 Timber sale economics

- Approximately 84 percent of harvest volume will be cable yarded with truck haul; remainder will be designed for an A-frame system.
- The intermittent small sales proposed by this alternative are not conducive to improving the economic viability of timber offerings.

Issue 7 Location and use of transportation systems and log transfer facilities

- There will be 5.0 miles of new roads built and an additional 6.8 miles of road reconstruction to make existing roads suitable for timber haul.
- All new roads and the Cape Pole to East Edna Bay road and the Cape Pole to West Edna Bay road will be actively maintained for the duration of a specific activity and maintenance levels would be consistent with levels of use. Activities such as timber harvest or habitat enhancement and rehabilitation would be the sole means for an active road maintenance program. No other maintenance would be scheduled, possibly resulting in some road closures. While there would be no direct effort to close these roads, other than that previously discussed, such action would be taken if roads or structures deteriorated to the point that public safety and resource protection could not be met without maintenance or reconstruction.
- Log transfer facilities will be developed at Nichin Cove and Cape Pole. There will not be a developed facility at Edna Bay.

Issue 8 Opportunity to enhance recreation potential

- A three-sided shelter will be constructed at Tenass/Brockman/Marble Pass.
- Primitive character of all areas will be maintained.

Alternative 4 All Resources

Description

This alternative emphasizes enhancement of local lifestyles by providing timber to sustain small local timber operations, while retaining much of the area's primitive nature. It also provides for maintenance of key wildlife and fish habitats to continue to accommodate local subsistence needs. It calls for a moderate level of visual resource protection and places primary emphasis on primitive recreation.

Based on public comments and additional field surveys, Alternative 4 has been modified from the way it appeared in the draft EIS. The following summarizes the major changes:

- Unit 7 in VCU 546 has been eliminated (54 acres, 2.3 mmbf, and .5 miles of new road construction) and has been reclassified as permanent wildlife old-growth habitat. This unit was dropped to prevent potential adverse effects to a Class I stream as a result of timber harvest activities. The north haul route from this unit has a stretch of 20 percent adverse

grade which is not negotiable for non-assisted loaded log trucks. Consequently, the haul would have logically gone south through Edna Bay and continued to Cape Pole. Elimination of this unit prevents this log haul through town. The reclassification of the unit to wildlife old-growth habitat permits black-tailed deer travel between two large blocks of old-growth forest. If the unit were converted to second growth through harvest, this travel corridor would be lost.

- Unit 8 in VCU 546 has been eliminated (94 acres, 3.2 mmbf, and .4 miles of new road construction) to prevent potential degradation of the headwaters of Charley Creek.
- Unit 2 in VCU 545 has been expanded to salvage windthrown timber on 5 acres (230 mbf) due north of the originally proposed unit.
- Unit 3 in VCU 544 has been modified to eliminate the northwest portion of the unit (55 acres, 2.3 mmbf, and .3 miles of new road construction). The eliminated portion of the unit, as well as the two points of land sheltering Pole Anchorage, has been reclassified as permanent old-growth wildlife habitat, providing an additional 340 acres. This old-growth wildlife habitat will provide beach fringe habitat for deer, as well as provide shelter for boats anchoring in this bay.
- Unit 2 in VCU 544 will be modified to buffer the two creeks it had originally proposed to cross. This will reduce the unit size by approximately 10 acres and 250 mbf.
- Unit 1 in VCU 544 will be modified to eliminate the portion west of the road. This will protect vital beach fringe wildlife habitat. This will reduce the unit size by approximately 15 acres and 450 mbf.
- Unit 10 in VCU 555 has been eliminated (11 acres and 275 mbf). This unit was a proposed clearcut of an entire small island designed for A-frame logging. This proposal was contrary to Tongass National Forest best management practices.
- Unit 3 in VCU 556 (16 acres and 730 mbf) has been eliminated because it has already been harvested (along with 17 additional acres) by the Cap Island Timber Sale. The NEPA coverage for this sale was a 1985 Categorical Exclusion.
- Unit 6 in VCU 556 (77 acres, 4.4 mmbf, and 1.1 miles of temporary road construction) incorporated efforts from a previously planned, but not implemented, sale. This unit has been added to consolidate planning efforts in an effort to speed up the sale of rapidly deteriorating dead, dying, and down timber (approximately 35 percent of the volume has been blown down).
- Unit 12 in VCU 543 (11 acres and 500 mbf) has been added to harvest windthrown timber. Other adjacent stands with windthrown timber will not be harvested because they are in old growth retention areas.
- Unit 9 in VCU 555 (12 acres 0.3 mmbf) has been dropped from this alternative. This unit was proposed to be A-frame logged. In close proximity to this unit is an oyster farm managed under a special use permit issued to Sea Otter Seafood. It is felt that A-frame logging of the unit would compromise the oyster farming operation.
- The log transfer facility proposed for Edna Bay has been eliminated in response to comments from Edna Bay residents. While this increases the length of the haul route for several of the harvest units, the Edna Bay log transfer facility needed considerable construction and had been previously denied a permit.
- Stream inventories will be conducted on Survey Creek and on the south fork of Trout Creek to see if enhancement projects are possible to mitigate effects of previous timber harvest activities in these drainages.

2 Alternatives

This alternative provides for:

1. The harvest of 46.2 mmbf over 1104 acres.
2. Haul of timber to LTFs at Nichin Cove or Cape Pole.
3. Approximately 6.7 miles of new road construction and an additional 1.1 miles of temporary road construction. The new specified roads (except the road accessing harvest unit 556-6 on Tuxekan Island) will remain open after harvest activities. There will be 6.8 miles of reconstruction of existing roads to make them suitable for log haul.
4. The new roads and the Cape Pole to East Edna Bay road and the Cape Pole to West Edna Bay road will be actively maintained; all other roads will be maintained consistent with the level of commercial or administrative use.
5. An average harvest unit size of 40 acres.
6. Variable-width buffers around streams and lakes

The following table, Table 2-4, more fully quantifies the outputs and impacts of this alternative.

Table 2 - 4

Outputs and Impacts for Alternative 4

VCU	Proposed Harvest		New Road Construction	Old-growth Prescription	Extended Rotation	AHMUs Entered for Harvest
	<i>Acres</i>	<i>MMBF</i>	<i>Miles</i>	<i>Acres</i>	<i>Acres</i>	<i>Number</i>
543	180	8.00	1.5	971	1851	0
544	156	4.56	1.1	671	0	1
545	75	3.34	0.1	0	43	0
546	87	3.97	1.3	703	689	1
555	71	2.06	0	1410	344	0
556	185	9.24	1.0	213	215	2
557	110	4.12	0.7	362	344	0
560	145	6.15	0.6	1392	43	0
587	95	4.18	0.4	402	1078	0
Total	1104	46.22	6.7	6124	4607	4

Alternative Development Guidelines

Development of this alternative was based on providing an even flow of timber to sustain small local logging operators. It emphasized rehabilitation and enhancement of key fishery habitats, but placed less emphasis on wildlife habitat diversity than Alternative 3. The following section documents the development of Alternative 4 in relation to the issues, concerns, and opportunities identified in Chapter 1:

Issues

Issue 1 Effect of timber harvest on populations of anadromous fish

- Harvest will occur in 4 AHMUs. Harvest will occur to the prescribed buffer along: 2600 feet of Class I streams, 3,000 feet of Class II streams, and 2000 feet in an estuary.
- Buffers will be of variable width as determined necessary to protect fisheries habitats.
- Fish habitat in the project area will be surveyed to determine the current habitat condition and to identify potential enhancement opportunities. An aquatic habitat plan will be developed, based on the collected data, with a particular emphasis on riparian enhancement.

Issue 2 Effects of timber harvest activities on old-growth dependent wildlife species

- Approximately 6124 acres will be prescribed for permanent classification as wildlife old growth habitat.
- This alternative will convert 536 acres (3.2 percent) of existing key black-tailed deer habitat to second growth.

Issue 3 Effects of timber harvest activities on visual quality

- Approximately 4607 acres will be allocated to extended rotation.
- Visual resources will receive minor impacts.

Issue 4 Maintenance of existing lifestyles

- This alternative proposes an annual timber harvest of approximately 4.6 mmbf, which will be available to provide employment for local loggers and wood processors.
- During the next decade, this alternative will provide 1104 acres for potential employment for tree thinners.
- Others not involved in these occupations will find no disruption to their current lifestyle.

Issue 5 Protection of subsistence use areas

- Deer populations will be adversely affected by the loss of 1104 acres of old-growth habitat and 455 acres of key winter range.
- Fish populations will benefit from habitat enhancement projects. There may be loss of habitat capability due to timber harvest activities.
- Approximately 6.7 miles of new roads will be developed which can provide access to new areas for subsistence usage. Continued timber haul will keep road systems open which might be closed otherwise.

Issue 6 Timber sale economics

- Approximately 90 percent of harvest volume will be cable yarded with truck haul; remainder will be designed for an A-frame system.
- The intermittent small sales proposed by this alternative would not help to improve the economic viability of timber offerings.

Issue 7 Location and use of transportation systems and log transfer facilities

- There will be 6.7 miles of new roads built. Another 1.1 miles of temporary road will be constructed and closed when logging operations are completed.
- An additional 6.8 miles of reconstruction will be necessary to make existing roads suitable for timber haul.
- The new roads (except the road providing access to harvest unit 556-6 on Tuxekan Island), the Cape Pole to East Edna Bay road, and the Cape Pole to West Edna Bay road will be actively maintained for the duration of a specific activity and maintenance levels would be consistent with levels of use. Activities such as timber harvest or habitat enhancement and rehabilitation would be the sole means for an active road maintenance program. No other maintenance would be scheduled, possibly resulting in some road closures. While there would be no direct effort to close these roads, other than that previously discussed, such action would be taken if roads or structures deteriorated to the point that public safety and resource protection could not be met without maintenance or reconstruction.
- The road providing access into harvest unit 556-6 on Tuxekan Island will be closed by removal of the modular bridge.
- Log transfer facilities will be developed at Nichin Cove and Cape Pole.

2 Alternatives

Issue 8 Opportunity to enhance recreation potential

- A three-sided shelter will be constructed at Tenass/Brockman/Marble Pass.
- Primitive character of all areas will be maintained

Alternative 5 Timber Commodity Emphasis

Description

This alternative will place emphasis on the timber sale program and provide a range of opportunities for different size logging operations. Decreased emphasis is placed on visual resource management and retention of wildlife old-growth habitat. This alternative would also result in the greatest modification to lifestyles of the local inhabitants. This alternative provides for:

1. The harvest of 98.3 mmbf over 2348 acres.
2. Timber haul to the most economical LTF at Nichin Cove, Cape Pole, Edna Bay, or West Orr.
3. Approximately 18.0 miles of new road construction.
4. The new roads, the Cape Pole to East Edna Bay road, the Cape Pole to West Edna Bay road, and the East Edna Bay to Ruins Point road will be actively maintained; all other roads will be maintained consistent with the level of commercial or administrative use.
5. An average harvest unit size of 50 acres.
6. Variable width buffers around streams and lakes as determined necessary to protect fisheries habitat.

The following table, Table 2-5, more fully quantifies the outputs and impacts of this alternative.

Table 2 - 5

Outputs and Impacts for Alternative 5

VCU	Proposed Harvest		New Road Construction	Old-growth Prescription	Extended Rotation	AHMUs Entered for Harvest
	<i>Acres</i>	<i>MMBF</i>	<i>Miles</i>	<i>Acres</i>	<i>Acres</i>	<i>Number</i>
543	652	29.08	5.3	971	131	0
544	275	9.27	1.9	331	0	1
545	185	8.64	1.0	0	0	0
546	381	16.33	5.5	618	697	3
555	169	5.29	0.9	1142	262	2
556	118	4.94	0.2	213	0	2
557	76	3.04	0.5	362	262	0
560	312	13.72	1.6	1392	43	0
587	165	7.38	1.1	363	915	0
Total	2333	97.68	18.0	5392	2310	8

Alternative Development Guidelines

Development of this alternative was based on the capacity of the project area to produce a sustained flow of timber. It relies on mitigation measures and standards and guidelines to minimize impact to the fisheries resource. Negative impacts to other resources and disruption of the lifestyles of the local inhabitants are consequences of this alternative. The following section documents the development of Alternative 5 in relation to the issues, concerns, and opportunities identified in Chapter 1:

Issues

Issue 1 Effect of timber harvest on populations of anadromous fish

- Harvest will occur in 8 AHMUs. Harvest will occur to the prescribed buffer along: 5200 feet of Class I streams, 14,000 feet of Class II streams, and 2000 feet in an estuary. Buffers will be of variable width as determined necessary to protect fisheries habitats.
- Fish habitat in the project area will be surveyed to determine the current habitat condition and to identify potential enhancement opportunities. An aquatic habitat plan will be developed, based on the collected data, with a particular emphasis on riparian enhancement.

Issue 2 Effects of timber harvest activities on old-growth dependent wildlife species

- Approximately 5392 acres will be prescribed for permanent classification as wildlife old-growth habitat
- This alternative will convert 910 acres (5.4 percent) of existing key black-tailed deer habitat to second growth.

Issue 3 Effects of timber harvest activities on visual quality

- Approximately 2310 acres will be allocated to extended rotation.
- There will be a reduction of scenic quality along major and minor marine travel routes. Two large clearcuts proposed for Tuxekan Island would be visible from the Forest Service cabin at Stanley Creek.
- Visual quality objectives for this alternative will be reduced to modification in the foreground and maximum modification in the middleground and background.

Issue 4 Maintenance of existing lifestyles

- This alternative proposes an annual timber harvest of approximately 9.8 mmbf, which will be available to provide employment for local loggers and wood processors.
- During the next decade, this alternative will provide 2333 acres for potential employment for tree thinners.
- Lifestyles of local residents will be disturbed by the timber harvest activities. This includes disturbance from the actual logging operations, as well as from having 2333 acres of old-growth forest harvested.

Issue 5 Protection of subsistence use areas

- Deer populations will be adversely affected by the loss of 2333 acres of old-growth habitat and 910 acres of key winter range. Deer travel and use patterns will change in response to isolation of old-growth habitat.
- Fish populations will benefit from habitat enhancement projects. There will be loss of habitat capability due to timber harvest activities within 8 AHMUs.
- Approximately 15.4 miles of new roads will be developed which can provide access to new areas for subsistence use. Continued timber haul will keep road systems open which might be closed otherwise.

Issue 6 Timber sale economics

- Approximately 91 percent of harvest volume will be cable yarded with truck haul; remainder will be designed for an A-frame system.
- Timber sale economics will benefit from larger sale offerings which can absorb road costs, reduce the unit fixed cost of moving in equipment, etc. In addition, Alternative 5 will provide a range of opportunities for different size logging operations.

2 Alternatives

Issue 7 Location and use of transportation systems and log transfer facilities

- There will be 18.0 miles of new roads built and an additional 7.5 of reconstruction of existing roads to make them suitable for timber haul.
- The new roads, the Cape Pole to East Edna Bay road, the Cape Pole to West Edna Bay road, and the East Edna Bay to Ruins Point road will be actively maintained for the duration of a specific activity and maintenance levels would be consistent with levels of use. Activities such as timber harvest or habitat enhancement and rehabilitation would be the sole means for an active road maintenance program. No other maintenance would be scheduled, possibly resulting in some road closures. While there would be no direct effort to close these roads, other than that previously discussed, such action would be taken if roads or structures deteriorated to the point that public safety and resource protection could not be met without maintenance or reconstruction.
- Log transfer facilities will be developed at Nichin Cove, Edna Bay, West Orr, and Cape Pole.

Issue 8 Opportunity to enhance recreation potential

- A three-sided shelter will be constructed at Tenass/Brockman/Marble Pass.
- Primitive character of most areas would be maintained, as most of logging is planned for areas highly modified by past logging. Tenass/Brockman/Marble Pass area would be modified by A-frame logging.

Comparison of the Alternatives

The following section compares the effects of each considered alternative in relation to the issues identified in Chapter 1.

Issue 1

Effect of Timber Harvest on Populations of Anadromous Fish

Alternative 1

- No timber harvest units.
- No fishery enhancement project.

Alternative 2

- Timber harvest in 4 AHMUs
- Variable width buffers, based on statement of needs by fishery biologist.
- Fishery enhancement projects to be determined by inventory of streams.

Alternative 3

- No timber harvest in any AHMU.
- Maximum buffer size on cutting unit boundaries adjacent to streams and lakes.
- Fishery enhancement projects to be determined by inventory of streams.

Alternative 4

- Timber harvest in 4 AHMUs.
- Variable width buffers, based on statement of needs by fishery biologist.
- Fishery enhancement projects to be determined by inventory of streams.

Alternative 5

- Timber harvest in 8 AHMUs.
- Variable width buffers, based on statement of needs by fishery biologist.
- Fishery enhancement projects to be determined by inventory of streams.

Issue 2

Effect of Timber Harvest on Old-Growth Dependent Wildlife Species

Alternative 1

- No old growth is converted to second growth.
- No key winter range for black-tailed deer is harvested.
- No old growth is permanently prescribed for old-growth wildlife habitat.

Alternative 2

- 702 acres of old growth are converted to second growth.
- 370 acres of key winter range for black-tailed deer are harvested.
- 5931 acres of old growth are permanently prescribed for old-growth wildlife habitat .

Alternative 3

- 955 acres of old growth are converted to second growth.
- 428 acres of key winter range for black-tailed deer are harvested.
- 5764 acres of old growth are permanently prescribed for old-growth wildlife habitat.

Alternative 4

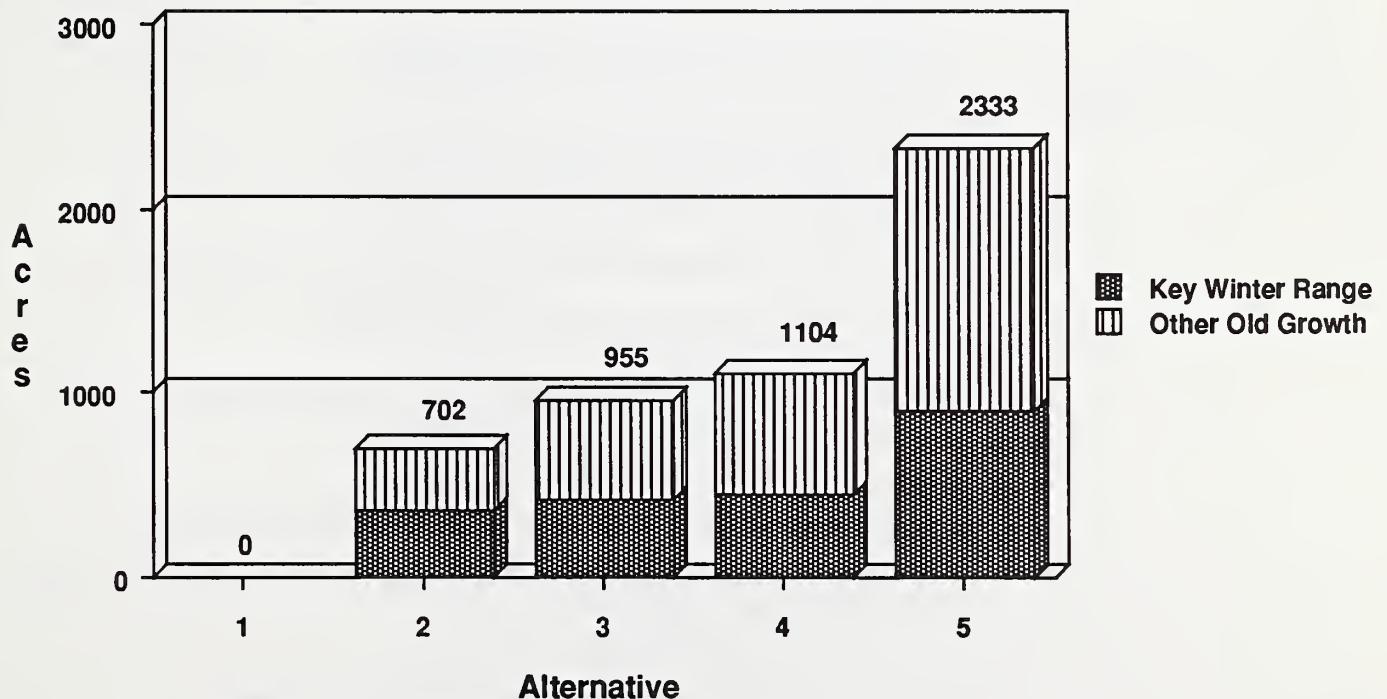
- 1104 acres of old growth are converted to second growth.
- 536 acres of key winter range for black-tailed deer are harvested.
- 6124 acres of old growth is permanently prescribed for old-growth wildlife habitat.

Alternative 5

- 2333 acres of old growth are converted to second growth.
- 910 acres of key winter range for black-tailed deer are harvested .
- 5392 acres of old growth is permanently prescribed for old-growth wildlife habitat.

Figure 2 - 1

Total Acres Harvested by Old Growth and Key Winter Range

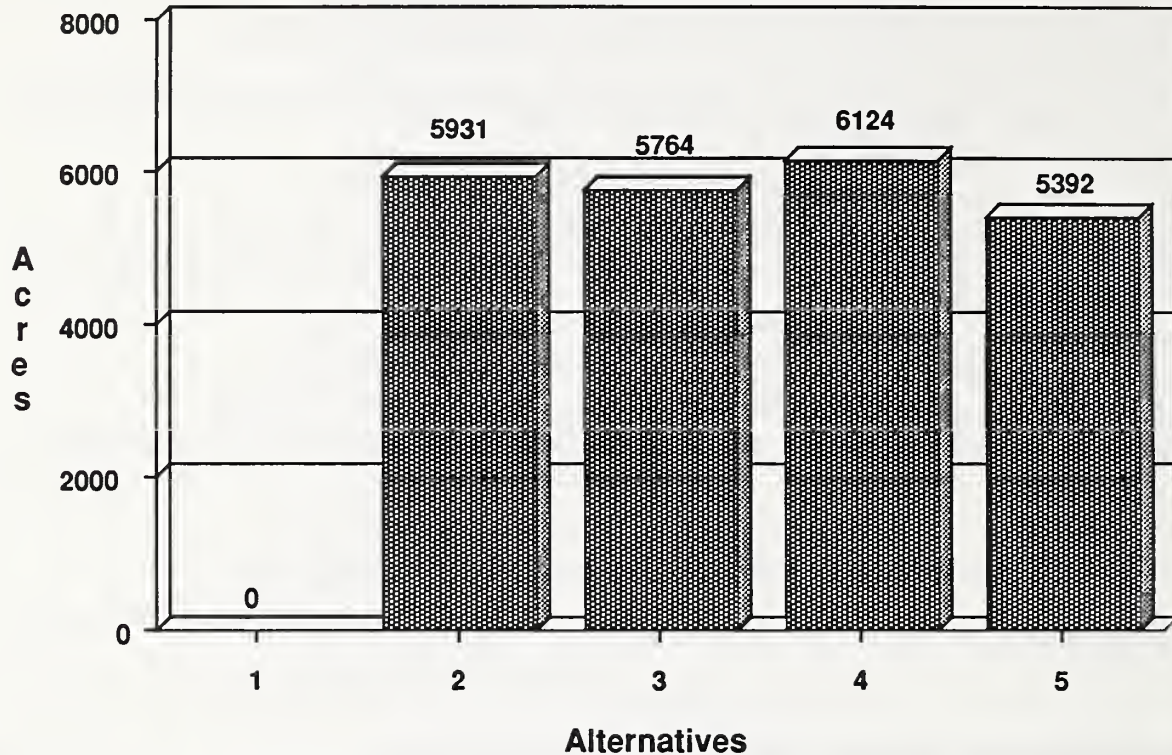


2 Alternatives

Figure 2.2 depicts the total acres of old growth permanently prescribed for old-growth wildlife habitat.

Figure 2 - 2

Permanet Old Growth Wildlife Habitat



Issue 3

Effect of Timber Harvest on Visual Quality

Alternative 1

- Because there is no timber harvest, there are no effects.

Alternative 2

- 3570 acres will be prescribed for extended rotation to preserve scenic quality.
- Harvest activities will produce only minor negative impacts.

Alternative 3

- 5306 acres will be prescribed for extended rotation to preserve scenic quality.
- Harvest activities will produce only minor negative impacts.

Alternative 4

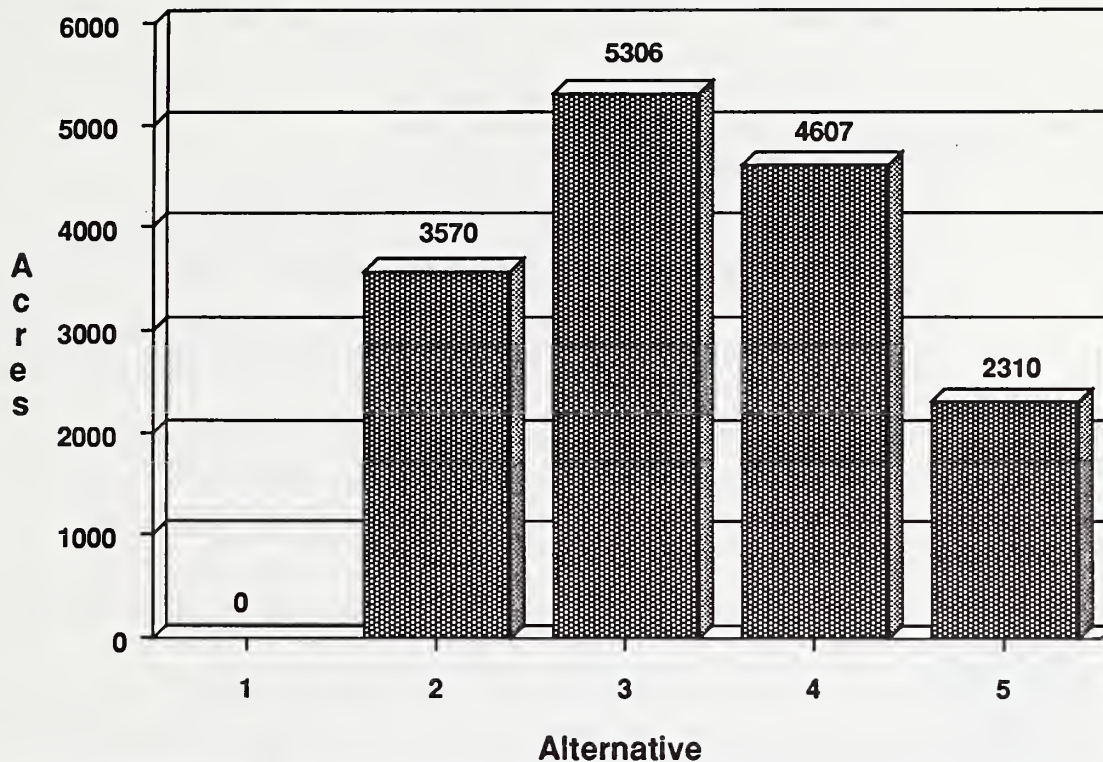
- 4607 acres will be prescribed for extended rotation to preserve scenic quality.
- Harvest activities will produce only minor negative impacts.

Alternative 5

- 2310 acres will be prescribed for extended rotation to preserve scenic quality.
- Harvest activities will reduce foreground to modification and the middleground and background to maximum modification.

Figure 2.3 depicts relative responsiveness of each alternative to this issue.

Figure 2 - 3
Acres Prescribed to Extended Rotation



Issue 4 Maintenance of Existing Lifestyles

Alternative 1

- Does not provide any employment opportunities.
- Does not expose residents to disruptions of logging activities.

Alternative 2

- Provides employment for loggers and wood processors (27.5 mmbf).
- Provides employment for tree thinners (702 acres).
- Approximately 700 truckloads of logs will pass through Edna Bay.
- Edna Bay LTF will be developed.

Alternative 3

- Provides employment for loggers and wood processors (36.6 mmbf).
- Provides employment for tree thinners (955 acres).
- Approximately 250 truckloads of logs will pass through Edna Bay.
- Edna Bay LTF will not be developed.

Alternative 4

- Provides employment for loggers and wood processors (46.2 mmbf).
- Provides employment for tree thinners (1104 acres).
- Approximately 250 truckloads of logs will pass through Edna Bay.
- Edna Bay LTF will not be developed.

2 Alternatives

Issue 5 Protection of Subsistence Use

Alternative 5

- Provides employment for loggers and wood processors (97.7 mmbf).
- Provides employment for tree thinners (2333 acres).
- Approximately 6100 truckloads of logs will pass through Edna Bay
- Edna Bay LTF will be developed.

Alternative 1

- There will be no timber harvest to adversely affect deer population
- There will be no fish enhancement projects to increase local runs of anadromous fish
- No new roads will be built which could be used for subsistence activities.

Alternative 2

- Deer populations will be affected by removal of 702 acres of old growth and 370 acres of key winter range.
- Variable width buffers to protect stream courses and lakes from timber harvest activities.
- Fish enhancement projects will increase local runs of anadromous fish.
- 4.5 miles of new roads will be built which could be used for subsistence activities.

Alternative 3

- Deer populations will be affected by removal of 955 acres of old growth and 428 acres of key winter range
- Fish enhancement projects will increase local runs of anadromous fish
- Large, fixed width buffers to protect stream courses and lakes from timber harvest activities
- 4.3 miles of new roads will be built which could be used for subsistence activities.

Alternative 4

- Deer populations will be affected by removal of 1104 acres of old growth and 455 acres of key winter range.
- Fish enhancement projects will increase local runs of anadromous fish.
- Variable width buffers to protect stream courses and lakes from timber harvest activities.
- 6.7 miles of new specified and 1.1 miles of temporary roads will be built which could be used for subsistence activities.

Alternative 5

- Deer populations will be affected by removal of 2333 acres of old growth and 910 acres of key winter range.
- Fish enhancement projects will increase local runs of anadromous fish.
- Variable width buffers to protect stream courses and lakes from timber harvest activities.
- 15.4 miles of new roads will be built which could be used for subsistence activities.

Issue 6 Timber Sale Economics

Alternative 1

- Because there is no timber harvest, this alternative does not address this issue.

Alternative 2

- The intermittent small sales proposed by this alternative are not conducive to improving the economic viability of timber offerings.

Alternative 3

- Same as Alternative 2.

Alternative 4

- Same as Alternative 2.

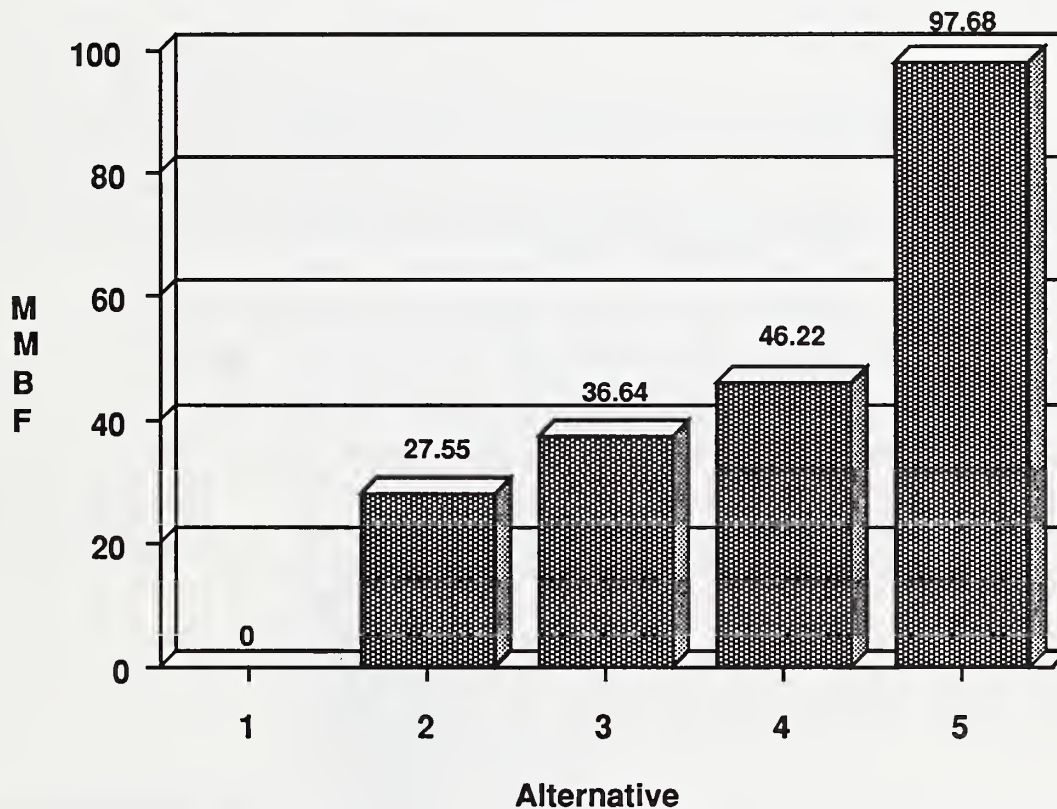
Alternative 5

- Timber sale economics will benefit from larger sale offerings which can absorb road costs, reduce the unit fixed cost of moving in equipment, etc. In addition, Alternative 5 can provide a range of opportunities for different size logging operations.

Figure 2.4 depicts relative responsiveness of each alternative to this issue.

Figure 2 - 4

Proposed Harvest for Each Alternative



Issue 7

Location and Use of Transportation Systems and Log Transfer Facilities

Alternative 1

- There will be no new roads built and no LTF developed for use. With no timber harvest planned, there will be no need to keep existing specified roads maintained or open. Existing roads will be closed as dictated by safety and budgetary constraints.

Alternative 2

- There will be 4.5 miles of new roads built and 3.9 miles of road reconstruction. LTFs will be improved and used at Cape Pole, Edna Bay, and Nichin Cove. The Cape Pole to East Edna Bay road will be actively maintained; all other roads will be maintained consistent with the level of commercial or administrative use. Continued timber harvest will be essential to keep existing specified roads maintained or open. Existing roads will be closed as dictated by safety and budgetary constraints.

2 Alternatives

Alternative 3

- There will be 5.0 miles of new roads built and 6.8 miles of road reconstruction. LTFs will be improved and used at Cape Pole and Nichin Cove. The Cape Pole to East Edna Bay road and the Cape Pole to West Edna Bay road will be actively maintained; all other roads will be maintained consistent with the level of commercial or administrative use. Continued timber harvest will be essential to keep existing specified roads maintained or open. Existing roads will be closed as dictated by safety and budgetary constraints.

Alternative 4

- There will be 6.7 miles of new roads built and 6.8 miles of road reconstruction. LTFs will be improved and used at Cape Pole and Nichin Cove. The Cape Pole to East Edna Bay road and the Cape Pole to West Edna Bay road will be actively maintained; all other roads will be maintained consistent with the level of commercial or administrative use. Continued timber harvest will be essential to keep existing specified roads maintained or open. Existing roads will be closed as dictated by safety and budgetary constraints.

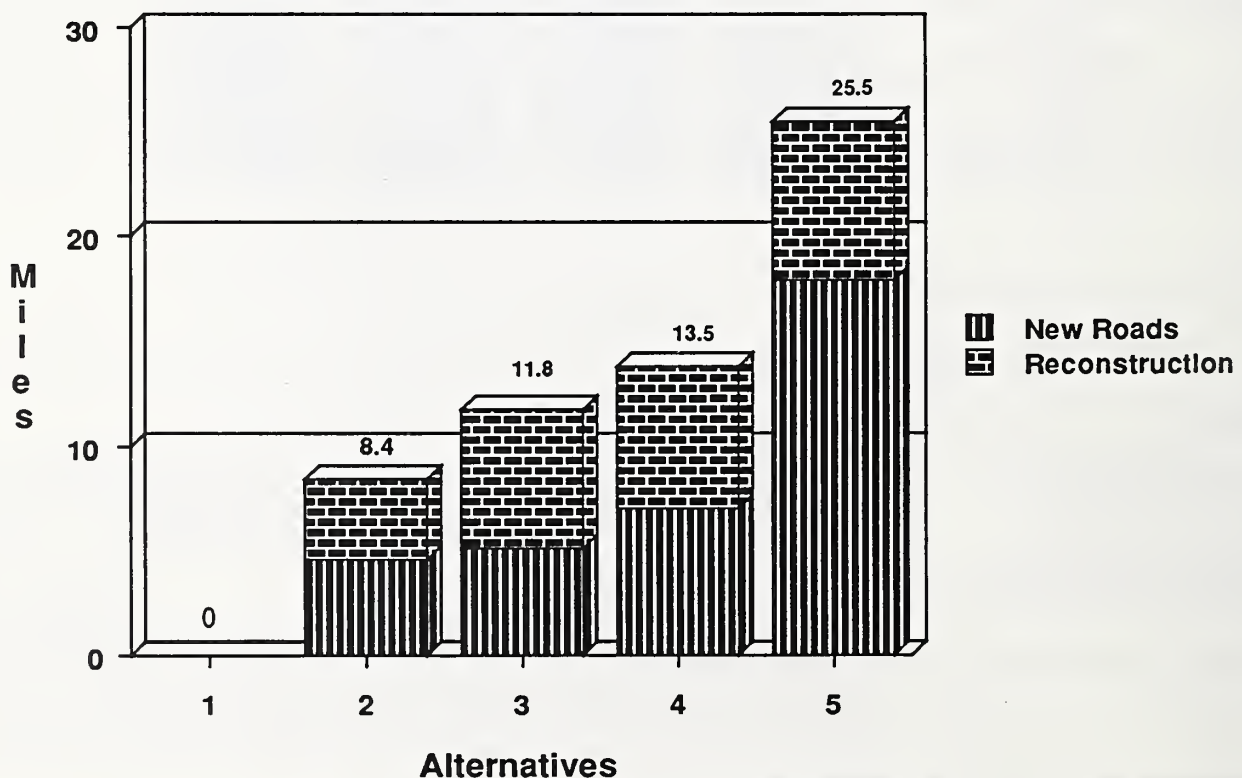
Alternative 5

- There will be 18.0 miles of new roads built and 7.5 miles of road reconstruction. LTFs will be improved and used at Cape Pole, Edna Bay, West Orr, and Nichin Cove. The Cape Pole to East Edna Bay road, the Cape Pole to West Edna Bay road, and East Edna Bay to Ruins Point will be actively maintained; all other roads will be maintained consistent with the level of commercial or administrative use. Continued timber harvest will be essential to keep existing specified roads maintained or open. Existing roads will be closed as dictated by safety and budgetary constraints.

Figure 2.5 depicts relative responsiveness of each alternative to this issue.

Figure 2.5

Miles of New Roads and Reconstruction



Issue 8

Opportunity to Enhance Recreation Potential of the Area

Alternative 1

- There will be no recreational facilities developed.
- The area will retain its primitive character.

Alternative 2

- A three-sided shelter will be built at Tenass/Brockman/Marble Pass.
- The area will maintain its primitive character.

Alternative 3

- Same as Alternative 2.

Alternative 4

- Same as Alternative 2.

Alternative 5

- A three-sided shelter will be built at Tenass/Brockman/Marble Pass.
- The area will lose some of its primitive character, as more timber harvest activities are evident.

Standards and Guidelines

Standards and guidelines define the methods and expected results for implementation of the proposed project. A standard or guideline is a statement of policy or procedure establishing the Agency's objective for specific aspects of implementation.

The standards and guidelines used for wildlife management and fisheries management portions of this project analysis are based on those previously established in the Alaska Regional Guide, the Forest Service Manual and Handbook, the Aquatic Habitat Management Handbook, and the Ketchikan Protection Standards. These documents are available for review at the Forest Supervisor's Office, Federal Building, Ketchikan, Alaska.

The Tenass Pass/Brockman Pass/Marble Pass area will be managed to retain the area's primitive recreation character and scenic qualities. The intent is to provide a semi-primitive non-motorized recreation experience. To implement this intent the following direction will be followed:

- Roads will not be constructed in the area.
- A-frame logging will be designed, with assistance from the landscape architect, to meet the Visual Quality Objective (VQO) of Partial Retention. Harvest units will be very small in size and dispersed widely.
- A no-harvest zone will be established in the foreground area seen from the chuck at Tenass Pass or from Brockman Pass.
- A three-sided shelter will be constructed of native materials at a site to be selected in Tenass Pass east of the chuck.

Currently used dispersed recreation sites or those with exceptional potential for recreation have been identified. These areas will receive special consideration to retain their recreational values and scenic qualities.

- A-frame harvest units: The boundaries of all A-frame harvest units will be adjusted during the layout process so that the unit meets the VQO of Partial Retention.
- Harvest units located in Retention, Partial Retention and Modification Visual Quality Objective areas will be designed to reflect landform and natural characteristics of the surrounding landscapes.

Visual Resources and Recreation

2 Alternatives

- Extended Rotation: Units in extended rotation areas would be designed to meet the VQO of Partial Retention.
- The following proposed units will not be released for harvest until the adjacent second-growth is found to be at least five (5) feet in height. The adjacent stands were harvested in 1986 or are in the process of being sold/logged: 556-3, 557-3, 560-1, 560-2, 587-1, and 587-2.

Anchorage

No timber harvest will be allowed which will expose boat anchorages to the wind. Harvest around high use anchorages will be managed to meet the visual quality objectives of retention in the foreground, partial retention in the middleground and background. Harvest around low use anchorages will be managed to meet the visual quality objectives of partial retention in the foreground and modification in the middleground and background.

Timber

A high priority is given to the salvage of dead, blowdown and other deteriorating timber.

Breakouts (multiple log landing areas) will be used to log A-frame units. These will ensure protection of shoreline, eagle and wildlife habitat unless unit consists predominantly of windthrow.

- Timber harvest may occur only on sites which can be adequately restocked with 300 trees per acre within 5 years of harvest.
- Harvest next to adjacent second growth may occur only after regeneration has reached a height of 5 feet (see Visuals for list of units).
- Unit harvest design will provide protection for existing regeneration during timber harvest.
- Alaska Regional utilization standards for timber will be met to provide optimum practical use of the wood resource.
- During felling and logging of individual units a Timber Sale Officer will be on site to assure contract compliance and protection of the resources.

Hydrology

Road construction probably has more effects on water quality than any other activity considered in this FEIS. To ensure water quality, best management practices (BMPs) will be followed.

Some of these include: incorporation of erosion control and stabilization measures; avoidance of highly unstable and oversteep slopes; location of roads in the vicinity of streams so that fish habitat standards can still be met; sloping of ditches; revegetation of exposed slopes; use of stable stream crossings as evidenced by bedrock control, vegetation, straight narrow channels; minimizing road grades; sloping of ditches and leaving cut slopes intact.

All practices will be used in consultation with the Forest Service Road Preconstruction Handbook, Drainage Structure Handbook, Alaska Forest Practices Act and with Executive Orders 11988 and 11990.

Mitigation Measures

The mitigation measures identified during this project analysis will be used during implementation of any action alternative to ensure that the objectives of the standards and guidelines are executed. The mitigation measures may be further refined as the project develops to respond to changed conditions, more detailed design and on-ground layout information, or monitoring results. As identified in the issues presented in Chapter 1, mitigation measures will focus on wildlife and fisheries habitat.

Fisheries Habitat

Logging activities for each alternative are proposed to occur adjacent to anadromous fish streams. To reduce potential impacts to these streams, an uncut buffer strip of riparian vegetation will be left along the stream bank. The width of this buffer strip will vary by alternative and is discussed in detail in Chapter 4.

Fish habitat in the project area will be surveyed to identify additional habitat restoration and enhancement opportunities. The existing fish ladder on Survey Creek in VCU 545 will be evaluated to determine whether the upstream habitat will benefit from additional improvements to the existing structure. An aquatic habitat management plan will be developed based on the collected data with a particular emphasis on riparian enhancement. Fish habitat surveys will be done on the following streams:

<u>Name</u>	<u>Species of fish</u>
Survey Creek	Pink & coho salmon, cutthroat
Karheen System	Sockeye, pink, coho salmon
Vans Sant	Pink & coho salmon
Unnamed Stream (T68S, 56°58' R76E 133°36')	Chum & coho salmon
Charley Creek	Pink, chum & coho salmon
Trout Creek	Dolly Varden, cutthroat, steelhead trout

Wildlife Habitat

Habitat for old-growth dependent species is protected by prescribing it for permanent wildlife old-growth retention. This prescription will be considered a permanent location until changes in technology or scientific evidence conclusively dictate a change is needed.

A no-harvest zone at least 100 feet wide will be left along the western boundary of Scott Lagoon, east of Unit 556-4 to provide for wildlife use. All eagle nests found during unit layout will be mitigated and reported to the wildlife biologist for coordination with US Fish and Wildlife Service.

Wildlife habitat surveys will be done to determine if the following enhancement projects are feasible:

- Precommercial thinning
- Canopy gaps
- Potential road closure
- Thermal areas

Canopy gap treatment will maintain or increase forage production (primarily vaccinium, cornus and skunk cabbage) after the canopy closes in second-growth stands. The canopy gaps will range in size from 75 to 150 feet in diameter. Canopy gaps will be done in two different age class categories consisting of 15-20 year old stands that are not to be thinned and 35-40 year old precommercially thinned stands.

Thermal cover will be provided in stands to be either precommercially or commercially thinned, to reduce energy consumption by wildlife during critical climatic periods. Thermal cover will consist of portions of units to be thinned in key deer winter range and marten habitat.

2 Alternatives

Visual Management

To provide additional latitude in the design of timber harvest units in visually sensitive areas, extended rotation areas will be prescribed. These areas will be managed for timber harvest on a 120-year rotation as opposed to a 100-year rotation. The VQO of Partial Retention will be implemented in these areas.

Monitoring

The management activities described in this FEIS will be evaluated through monitoring and modified if the effects do not fall within expected limits. New information may necessitate the updating or revision of standards and guidelines, best management practices or standard operating procedures.

Timber Monitoring Plan

All harvested units will be surveyed according to the following schedule: (1) at the end of the third growing season after harvest to monitor regeneration stocking levels; (2) after the tenth growing season for precommercial thinning selection; (3) after thinning for stocking level for contract compliance; (4) at 30-40 years for commercial thinning potential; and (5) after commercial thinning for contract compliance.

Aquatic Habitat Monitoring Plan

There are three levels of monitoring for determination of the effects of timber harvest operations on the fish production capability of aquatic habitat: (1) compliance monitoring; (2) long term determination of habitat capability trends of the harvest units affected channel types; and (3) calculation of the coho salmon capability based on population sampling of representative micro-habitats of the affected channel types.

Level One - Compliance monitoring

Check all streams within harvest units to determine whether site specific prescriptions to maintain aquatic habitat productivity were implemented.

Level Two - Monitoring prescription effectiveness

Examine a representative sample of streams to determine if the protection prescriptions were successful in meeting the resource objectives. Selection criteria for units to be monitored will be based on channel type, geomorphic area and plant association. The two primary objectives to monitor are the maintenance of the amount and quality of the large organic debris (LOD) and the overall stability of the stream banks within the stream reach.

Level Three - Monitoring fish populations

To determine the effect of timber sales on the habitat capability of affected reaches, fish population surveys will be performed. Primary objectives of the population surveys will be to establish the carrying capacities of the micro-habitats. These population estimates in combination with the Level 2 survey will be used to evaluate the effectiveness of the prescriptions employed to protect the biological productivity of fish streams influenced by timber sale activities.

The monitoring survey for Sea Otter Sound will be coordinated with the ongoing survey throughout the Ketchikan Area to validate the habitat capability of various channel types by plant association and geomorphic area. Basis for capability will be validated micro-habitat evaluations of affected streams. The Sea Otter Sound area will provide one sample site for streams in the limestone geomorphic province.

Wildlife Habitat Monitoring Plan

There are two levels of monitoring for determining the effects of timber harvest operations on the wildlife production capability of terrestrial habitat. The two levels of monitoring include : 1) compliance monitoring, and 2) long term determination of mitigation compliance within affected potential management indicator species (PMIS) habitat.

Level One – Compliance monitoring

Check of all harvest units to see if habitat mitigation measures were accomplished.

Level Two – Monitoring prescription effectiveness

Examine a representative sample of units to determine if the mitigation prescriptions were successful in meeting the resource objectives. Selection criteria for units to be monitored will be based on Wildlife Habitat Monitoring Units (WHMUs), geomorphic area, plant association and treatments used. The four primary objectives of monitoring are: (1) the maintenance of the amount and size of snags retained for nesting and denning habitat, (2) the size and quality of nesting and denning islands retained for cover, (3) the wildlife usage of maintained thermal cover areas, and (4) the reduction or restriction of human access.

The monitoring level selected will be determined by both funding and personnel availability.

Identification of the Forest Service Preferred Alternative

The Forest Supervisor of the Tongass National Forest, Ketchikan Administrative Area has chosen Alternative 4 as the preferred alternative. It fully meets the primary objective for this FEIS of the providing timber harvest units which will be suitable for sale, under the Small Business set aside program, to local independent logging operators.

Chapter 3

Affected Environment

Chapter 3

Affected Environment

This section describes the environmental components of the area that would affect and would be affected by the alternatives if implemented.

Overview

The North Sea Otter Sound area is located off the northwest corner of Prince of Wales Island in southeast Alaska. It is composed of the Marble, Orr, El Capitan, Tuxekan islands, and the southwest portion of Kosciusko Island, as well as numerous smaller islands. The climate is dominated by a strong maritime influence, characterized by mild, rainy weather.

The project area has some of the most productive timber growing sites in southeast Alaska and has been extensively logged in the past. Over the last 50 years, approximately half the original old growth has been harvested. Natural regeneration in harvested areas has restocked the sites, many of which have been precommercially thinned. Western hemlock and Sitka spruce are the major species, with western red cedar and Alaska yellow cedar playing minor roles in the forest canopy.

To support previous timber harvest activities, an extensive road network has been developed, with approximately 170 miles of inventoried roads. These roads support not only timber harvest activities, but also provide access for the residents of the two major communities within the study area. Edna Bay, located on Kosciusko Island, consists of approximately 20 families, while Token, located on El Capitan Island, has approximately 12 residents. Local residents use the areas resources for subsistence activities, e.g., fishing, hunting, trapping, food gathering, firewood cutting, etc. The major sources of employment are commercial fishing, logging, tree thinning, oyster farming, and a small resort.

The area has an abundance of wildlife, including black-tailed deer, black bear, pine marten, and bald eagle. Streams and lakes support populations of resident trout and provide habitat for anadromous fish. The off-shore waters abound with species of marine fish and crab. The project area has high scenic quality and provides superb marine recreation with its intricate arrangement of islands and protected waterways.

Fisheries

Fishing provides a major source of food and income for Southeast Alaska and for the people utilizing the North Sea Otter Sound project area. Streams and lakes in the area provide spawning and rearing habitat for pink (humpy), chum (dog), coho (silver), and sockeye (red) salmon. Steelhead trout, dolly varden char, and coastal cutthroat trout contribute to a growing sport fishery. The maintenance of a strong and productive fishery, therefore, is very important to the area's economy. Sustaining the production of salmon for subsistence, commercial, and

sport harvest is dependent upon specific harvest management plans and habitat protection. Timber harvest activities can have a significant effect on freshwater habitat that may result in impacts on salmon production. This section identifies the salmon production potential and aquatic habitat conditions in the North Sea Otter Sound project area.

The salmon escapement data indicates the average annual salmon production potential of the streams and lakes in the Project Area is substantial (See Table 3-1). Pink salmon contributes the largest portion of the production potential followed in order of abundance by chum, and coho salmon. Most of this production is derived from Trout Creek (VCU 543) and the streams in VCU 546. These streams also provide habitat for anadromous trout and char, but the level of production is unknown.

Table 3 - 1

Annual Spawning Salmon Escapement in Aerially Monitored North Sea Otter Sound Salmon Spawning Streams

VCU / Streams	Coho	Pink	Chum	Sockeye
543				
Trout Creek	no data	no data	no data	no data
544	no data	no data	no data	no data
545				
Survey Creek*	Occasional	0-12,000	Occasional	0
546				
Edna Bay	0	200-4,000	0	0
Edna Bay	0	800-33,000	Occasional	0
Charley Cr.	0-500	2,000-85,000	0-500	0
Edna Bay Head	Occasional	450-40,000	Occasional	0
Hamlin Creek	Occasional	100-10,000	0-100	0
Van Sant Creek	Occasional	500-40,000	Occasional	0
555	no data	no data	no data	no data
556				
West El Capitan	0	100-10,000	Occasional	0
557	no data	no data	no data	no data
560	no data	no data	no data	no data
587	no data	no data	no data	no data

* monitoring discontinued in 1977

Source: ADF&G Commercial Fish Division

A description of stream conditions in this project area is facilitated by the use of a three-level stream classification system described in the Aquatic Habitat Management Handbook (USDA Forest Service 1986a). Each Stream is subdivided into Aquatic Habitat Management Units (AHMU), which are based on fish use and stream channel characteristics. The area defined by an AHMU includes the stream channel, the stream channel type, areas within braided stream channels, and adjacent riparian areas containing side channels and sloughs. In absence of any site specific information it includes an area at least 100 feet wide on either side of the stream.

Class I streams, as defined in the Aquatic Habitat Management Handbook, are stream channels that are accessible to anadromous fish (i.e., pink, chum, sockeye, and coho salmon) or channels upstream of migration barriers, which have reasonable enhancement opportunities for anadromous fish, or are high quality resident fish habitat. Class II streams as defined in the Handbook, are stream channels that have a steep gradient (6 to 15 percent) and generally only contain resident fish or channels that are upstream of a migration barrier to anadromous fish. Class III streams do not have fish populations but have water quality influence on downstream aquatic habitats in Class I and Class II channels.

Eighty-three miles of streams and 339 acres of lakes have been surveyed in the project area. Class I streams account for 51 percent (42 miles) of the known available habitat. Class II streams which do not have anadromous fish, account for 49 percent of the habitat. Two hundred fifty-four acres of the lake habitat was found to be anadromous fish habitat.

The project area has been extensively logged and roaded. A proportion of the available fish habitat in Class I and Class II streams has potentially been affected by those timber harvesting and roading activities. Twenty nine percent (14.8 miles) of Class I stream habitat has had logging activity adjacent to the stream bank (i.e., on one or both sides) as of 1990 (Table 3-1). Twenty seven percent (13.2 miles) of Class II and Class III stream habitat has had logging activity adjacent to the stream bank as of 1990 (Table 3-2). Survey Creek (VCU 545) has had the most cumulative logging activity.

Table 3 - 2

Percentage of Stream-side Harvest Through 1987

<i>VCU</i>	Class I Harvest 2 Sides	Class I Harvest 1 Side	Class II and III Harvest 2 Sides	Class II and III Harvest 1 Side
543	07	02	08	03
544	43	0	30	03
545	77	0	57	0
546	12	15	11	11
555	12	15	11	09
556	42	17	39	13
557	30	70	40	60
560	0	11	19	11
587	0	0	0	0
Total	19 %	10 %	20 %	07 %

The stream characteristics likely to change as a result of management activities are 1) potential for large organic debris recruitment, 2) channel stability, 3) stream temperature, 4) nutrient cycling, 5) stream flow regimes and 5) sediment transport. If timber harvest and road building affect or change any of these components, the productive capability of the stream will change. Changes can be positive or negative depending on the type of streamside management, the amount of past harvest, and maintenance requirements. Some stream channels are affected more than others by similar activities. When all timber and large organic debris is removed, the loss of fisheries production is estimated to be 50 percent for the first 120 years for rearing fish (Murphy, et al. 1986). Recovery will be sooner if only one side is completely logged.

In summary, the project area supports a high quality, high value fishery resource. Previous timber harvests have potentially degraded fish habitat capability to a degree that is not readily quantifiable in numbers of fish.

Watersheds

The water quality of southeast Alaska is good in terms of sediment levels, temperature, and water chemistry. A combination of steep slopes, heavy precipitation, and limited water-holding capacity of the watersheds results in a fairly predictable seasonal flow characteristics. The watersheds within the North Sea Otter Sound project area fit within the norm for southeast Alaska. The alternative maps which accompany this FEIS show the locations of the lakes and Class I, II, and III streams.

Summer temperatures in main channel streams in the study area normally range from 37 degrees to 52 degrees Fahrenheit, but occasionally exceed 60 degrees. The frequent cloudiness, temperate air temperature, steep channel gradients, and frequent precipitation that characterize this region keep summer stream temperatures below the range considered harmful to fish most of the time. However, fish kills due to high temperatures have been documented in southern southeast Alaska; this includes the project area. A fish kill in Trout Creek (VCU 543) due to stream temperature was documented in 1977. No other fish kills related to stream temperature have been documented in the area. The potential for temperature related fish kills still exists. Factors that could lead to these events include extended dry and low-flow periods, high air temperatures, and large salmon runs that become isolated in stream pools within the intertidal area. Valley and stream riparian characteristics, and the presence of lakes, may also play a part in these fish kills. Streams with extensive lakes or muskegs along their courses are more likely to have high temperatures if forests are cut without leaving riparian vegetation to provide shade. Several of the streams within the Project Area are associated with lakes and in a number of instances the riparian area has been harvested (Table 3-2).

Forty-three percent of all commercial timber within the NSOS Project Area has been harvested (Table 3-3). The timber harvest ranges from 20 percent in VCU 555 to 74 percent in VCU 545. Stream temperature and stream flow are also related to the percent of timber harvest within the watershed. Measurable changes in stream flow and stream temperature can occur when watershed harvest exceeds 25 percent and 30 percent respectively.

Table 3 - 3
Acres and Percent of CFL Harvested through 1987 by VCU

VCU	Acres CFL	Acres Harvested	Percent Harvested
543	11,000	4,292	39
544	5,315	3,790	71
545	5,515	4,097	74
546	6,468	2,868	44
555	10,034	2,011	20
556	5,144	1,920	37
557	4,021	2,087	52
560	5,081	1,602	32
587	3,398	1,370	40
Total	55,976	24,037	43

A factor which can potentially affect the amount of sedimentation and possibly can affect stream temperatures within the project area is the density of the road system. An extensive road system has been built in the area (See the Alternative Maps). There are 5 bridges and 2113 culverts on the 228 miles of road. Of these stream crossings, only 96 are on Alaska Department of Fish and Game (ADF&G) catalogued streams (Table 3-4).

Table 3 - 4

Miles of Existing Road and Number of AHMU Stream Crossings

VCU	Miles of Roads	Number of AHMU Stream Crossings
543	33.3	16
544	26.4	14
545	38.0	19
546	37.4	14
555	32.9	14
556	14.4	9
557	16.5	3
560	17.2	3
587	12.4	4
Total	228.5	96

Winter stream temperatures range from 32 degrees to 37 degrees Fahrenheit in southeast Alaska. Cold winter temperatures may be an important factor limiting fish production. A two to six week period of sustained subfreezing weather generally occurs annually between November and February. The combined effects of severely reduced stream runoff and low air temperature can cause freezing of stream surface and intergravel water. Low temperatures are generally most acute under the following conditions: elevation above 200 feet, low surface runoff, streams with little ground-water recharge, and little or no snow cover. Streams located in alluvial bottom-lands with significant ground-water recharge are least susceptible to low temperature problems. There are no known low water temperature problems in the project area.

Marine Environment

Southeast Alaska coastline comprises approximately 30,000 miles of tidal shoreline, roughly 60 percent of the total Alaskan coast. Within this region occurs a great diversity of habitats that collectively account for the complexity of southeast Alaska's estuarine and tidal environments.

The marine environment encompasses a wide variety of ecosystems. This section deals primarily with the intertidal and subtidal marine environments that are subject to effects from A-frame logging, log transfer and storage facilities. The preferred sites for A-frame logging are areas that rise quickly in elevation from the shoreline. The preferred sites for log transfer facilities, log storage areas, camp settlements, and anchorages are deep bays, or along protected straits or channels. Other marine areas are not addressed here because they are beyond the scope of activities associated with the timber harvest being evaluated in this FEIS. In the past large numbers of acres of timber within the project area were yarded to the marine environment with an A-frame yarder. Seventeen LTFs have been constructed in the project area (Table 3-7). They are all currently inactive and 8 of the sites have been abandoned.

The shallow marine waters and associated mud flats and estuaries that are found in the protected coves and bays provide vital habitat for important food species, such as Dungeness crab, clams, and salmon. They are part of a complex and dynamic ecosystem that includes shrimp, a variety of fish, marine worms, echinoderms, sponges, sea anemones, shellfish, plankton, marine algae, and other organisms.

The potential impacts that are of concern at log transfer facilities and A-frame logged sites relates primarily to the deposition of bark. Laboratory tests show that bark deposits may be a source of toxic organic leachates that may be harmful to salmon fry and crab larvae. The accumulated bark may also smother benthic organisms. The rate of accumulation varies with conditions at each site. The design of the LTF and how the A-frame yarder is operated partially determines the amount of bark lost (directly associated with the speed of log entry into the water), and the configuration of the location determines the dispersion of the bark by current and winds. Log raft storage areas accumulate bark at a much slower rate than the immediate area of the log transfer facility. Little quantified information is available that documents decomposition, flushing rates, recovery times, recolonization rates, or other information about the longevity of bark and its affects on the marine benthic environment.

The LTFs at Edna Bay, Nichin Cove, West Orr, and Cape Pole have been in operation long enough that bark is a feature of those sites. Freese (1987) indicates that once benthic deposits of bark are in place, they are very resistant to decomposition or transport away from the immediate area. However, the area impacted by bark is relatively restricted. At 13 LTFs evaluated in southeast Alaska, bark deposits averaged 2.4 acres per sites. There is no information on the extent of bark deposits associated with A-framed yarded timber harvest units.

Other effects associated with log transfer facility and A-frame yarder operations are oil, grease, and other petroleum product pollution. Persistent loss of small volumes of petroleum products is a concern, as water soluble compounds have been shown to be toxic to marine larvae and eggs at concentrations of 0.1 milligrams/liter. Frequent monitoring of these operations for compliance with water quality requirements minimizes the potential for this type of pollution.

Sea Otter Sound is an abundant producer of a variety of sought-after fish and shellfish species. Marble Passage between Marble and Orr Islands (VCU 555) is considered by ADF&G to be a biologically rich area that is a vital juvenile fish rearing habitat. Dungeness and Tanner crab, shrimp, sea cucumbers, abalone, and chinook, coho, chum and pink salmon are presently being commercially harvested. Commercial harvest of these species is substantial. Annual purse seine harvest of pink salmon ranges from 0 to 2.3 million pounds, chum salmon ranges from 0 to 235 thousand pounds, coho salmon ranges from 0 to 122 thousand pounds, and sockeye ranges from 0 to 8,000 pounds. Fishermen harvested over 400,000 pounds of sea cucumbers and 34,000 pounds of shrimp in 1990. Since 1978, the annual abalone harvest has ranged from 300 pounds to 18,000 pounds. Just under 12,000 pounds of Dungeness crab were harvested during the 1987/88 commercial crab season. ADF&G is presently considering the potential for a commercial fisheries in the Sound for sea urchins. They indicated kelp (*Macro Cystis*) is also being commercially harvested in Sea Otter Sound. There are three permitted private shellfish aquaculture ventures in the Sound and ADF&G indicated interest is being shown in developing additional private aquaculture ventures in the area.

Wildlife

The North Sea Otter Sound project area supports a variety of wildlife species that occupy diverse habitats. Sitka black-tailed deer, black bear, pine marten, and river otter are important game and subsistence species. Population levels for deer, bear and furbearers in the study area are not known. Deer use ranges from high on Orr and the small outer islands to moderately low

on Kosciusko Island. Black bears are common on Kosciusko. Furbearers are found throughout the planning area. Waterfowl are found in many inlets. The humpback whale, currently classified as a threatened/endangered species, is often seen in North Sea Otter Sound and surrounding waters.

Subsistence hunting and trapping are very important to the residents of the project area, as well as to others who have traditionally used this area for subsistence activities. Because of its relative remoteness and the focus of local residents on subsistence activities, nonconsumptive wildlife use in the project area is not as important as in other areas of southeast Alaska.

The following wildlife sections will discuss Wildlife Habitat Management Units, existing acres of old growth within Wildlife Habitat Management Units, Management Indicator Species (MIS), existing MIS habitat, and threatened, endangered and sensitive species.

Wildlife Habitat Management Units (WHMUs)

Habitat units are a system to classify all terrestrial and aquatic habitats of a forest based on the habitat relationships of the Forest's indicator species. General definitions of the habitats are as follows:

Alpine

This WHMU includes areas at or above 2000 foot elevation. Sitka black-tailed deer use alpine areas extensively in summer, with a preference for areas offering shrub forest for hiding cover (Suring and Sidle 1987). They also state that bears seek out recurrent slide zones as foraging areas, especially in spring when other foods are scarce and in the fall prior to hibernation.

Subalpine

This WHMU encompasses a 1000-foot wide strip of land surrounding the alpine and may occur in absence of an alpine zone. Many animals feed in the alpine areas, while resting and breeding, escaping, and seeking thermal cover in the subalpine. Sitka black-tailed deer and black bears are two wildlife species of most concern that utilize this habitat.

Estuarine

This WHMU encompasses a 1000-foot wide forested strip surrounding estuaries. Black bears commonly feed in estuaries following emergence from their dens in the spring and during salmon runs. Vancouver Canada geese, common Mergansers and other waterfowl, furbearers, bald eagles, and nongame birds and mammals make use of this habitat. This WHMU overlaps the beach, deer winter range and high value bear habitat.

Beach

This WHMU includes land within 300 feet of saltwater shore and frequently overlaps with deer winter ranges. Beach fringe forests provide key nesting habitat for bald eagles, and are used year-round by river otter and mink.

Lakeside

This area lies within 500 feet of lakes greater than ten acres in size. The unit provides habitat for water-oriented wildlife (geese, furbearers, etc.). For analysis purposes, lakeside is included in the Aquatic Habitat Management Units (AHMUs) of this document's Fisheries section.

Streamside

This WHMU includes the areas within the AHMU buffer of anadromous or resident fish streams. These rivers and streams overlap high value bear habitat during salmon runs, and are important habitats for water-oriented furbearers.

Upland Forest

All land not included in other WHMUs are included in this section.

Key Deer Winter Range

This WHMU includes land outlined by the following criteria:

1. Area less than or equal to 500 feet in elevation on aspects from 90 to 135 degrees and from 225 to 270 degrees.
2. Area less than or equal to 1000 feet in elevation on aspects from 135 to 225 degrees.
3. Includes areas occupied by deer during severe winters but that may not conform to the other criteria. TLMP maps and local ADF&G biologists assisted in the identification of these areas.

Intermediate Deer Winter Range

All lands not in alpine, subalpine or Key Deer Winter Range are classified as Intermediate Deer Winter Range.

Old-Growth

Old-growth timber is important to many wildlife species because of the vertical and horizontal diversity it contains and it provides forbs for deer during winters of heavy snow accumulation. The timber harvest history and amount of old growth remaining within the Wildlife Habitat Management Units are presented in Table 3-5.

Table 3 - 5

Acres and Percent of Old Growth within WHMUs

	Acres of Previous Harvest in WHMU*	WHMU Remaining	Percent of Old-Growth WHMs*
Key Winter Range	16,032	16,737	51
Inter. Winter Range	7,505	9,066	55
Estuarine	39	213	82
Beach	2,770	8,916	76
Streamside	848	588	41
Lakeside	376	640	63
Subalpine	20	475	96
Alpine	0	0	100
General Forest	19,984	21,147	51
Totals	24,037	31,939	57

* Winter Range can overlap other WHMUs

Management Indicator Species (MIS)

Management Indicator Species (MIS) are species of vertebrates or invertebrates whose population changes are believed to indicate the effects of land management activities. The MIS are used to meet the requirements for maintenance of population viability and biological diversity and to establish management goals for species in public demand. Potential management indicator species were selected from three basic categories: species commonly hunted or trapped; species that indicate environmental suitability for a group of species; and species identified as threatened, endangered, or sensitive. The following species were selected for the project area:

Sitka black-tailed deer

Sitka black-tailed deer was chosen as a MIS because it is an important game species. Deer habitat is defined as Key Deer Winter Range and Intermediate Deer Winter Range. For

additional information on the Sitka black-tailed deer, please see the 1989-94 KPC Long Term Sale FEIS (Chapter 3, pages 98-99).

Wolves utilize all habitat types, however population numbers are more closely related primarily to deer populations than to habitat characteristics. Gray wolf abundance usually parallels deer abundance, therefore, any activity affecting deer populations is assumed to have a similar affect on gray wolf populations.

In the project area, harvest has occurred from the 1940s through 1990. The percent of previously harvested key and intermediate deer winter range is listed in Table 3-6. Twenty to twenty-five years following harvest, canopy closure shades out the understory eliminating forage production. During this stage, forests provide thermal cover with little forage available. Precommercial thinning prior to canopy closure (approximately 12-18 years) may extend forage production, at the expense of thermal cover qualities, for 10-25 years (stand age of 25-45 years) depending upon spacing and site productivity. Where cover provided by second-growth occurs adjacent to foraging areas, little loss of habitat carrying capacity is expected. There are extensive stands of dense closed forest canopy (25-100 years old) which exclude understory forage production and possibly has resulted in a substantial decline in the habitat carrying capacity of the area.

Black Bear

Black bear is a hunted species in the project area. Although black bears utilize all available habitats, their use is seasonally concentrated within riparian, estuarine, lakeside, and beach habitats. For additional information on the Black Bear please see the 1989-94 KPC Long-term Sale FEIS (chapter 3, page 100).

Black bears are highly adaptable and can tolerate moderate disturbances, such as habitat alteration, as long as the basic requirements for food and cover are satisfied (Lawrence 1979). The percent of previously harvested black bear habitat is listed in Table 3-6. By maintaining areas where old-growth, older second-growth and young second growth are interspersed, bear populations may actually increase; however, this type of diversity has been lost on portions of the project area due to successional changes as a result of intensive past harvest.

Marten

The pine marten is an important furbearer in the project area. Marten utilize the following habitats: upland forest, deer winter range, estuarine, and subalpine. For additional information on the pine marten please see the 1989-94 KPC Long-Term Sale FEIS (chapter 3, pages 99-100).

Marten are dependent upon old-growth habitat for reproduction and survival; higher volume stands (greater than 30 MBF/acre) are utilized more than lower volume stands. The percent of previously harvested Pine Marten habitat is listed in Table 3-6. North Sea Otter Sound populations may have declined due to the reductions in habitat and increased trapping pressure within roaded areas.

River Otter

The river otter is an important furbearer in the project area. Estuarine, beach and streamside are the habitat units utilized most by river otter. For additional information on the river otter please see the 1989-94 Operating Period for the KPC Long-Term Sale FEIS (Chapter 3, page 101).

The percent of previously harvested river otter habitat is listed in Table 3-6. River otter harvests are increasing throughout Alaska with over 430 pelts taken in 1983-1984 (Townsend 1986).

Cavity Nesters

The highest density of denning and nesting occurs adjacent to streams, lakes, and estuaries. Some species are dependent upon old-growth (e.g., common merganser, hairy woodpeckers) while others utilize snags near cutover areas (e.g., flying squirrel, red-breasted sapsucker). Because previous clearcutting has removed most of the snags within the units, populations have been on a downward trend. The percent of previously harvested cavity nester habitat is listed in Table 3-6.

Early Successional Stage Species

This group of species (e.g., long tailed vole, orange crowned warbler) utilizes all habitats associated with grass-forb and seedling-sapling stage vegetation.

Harvest benefits these species for approximately 20 years. Additional habitat was created for these species along road corridors. In the project area, harvest has occurred from the 1940s through 1990. The percent of previously harvested early successional stage species habitat is listed in Table 3-6. It is anticipated that there was a temporary increase in the populations for areas where the second growth was under 20 years of age and a decrease is anticipated as the available habitat reaches over 20 years of age.

Bald Eagles

Bald eagles are considered a species of special interest in Alaska. The bald eagle and its habitat have been given special protection through the Bald Eagle Protection Act and the Memorandum of Understanding between the Forest Service and the Fish and Wildlife Service. A few of the issues discussed under the Memorandum of Understanding are: 1) eagle nest trees receive a 330 foot radius habitat management zone, 2) recommended guidelines for blasting within one-half mile of eagles or active nests, and 3) repeated helicopter flights (heliports and helicopter logging flight corridors) within 1/4 mile distance from active eagle nests are to be avoided.

The majority of bald eagles in southeast Alaska nest in coniferous forest habitats along the coastline and associated saltwater inlets (Suring et al. 1988). Eagles prefer to nest in contiguous stands of old growth rather than in narrow leave strips of old-growth trees. Of the 3,850 nests surveyed, 92 percent occurred within 300 feet of the shoreline (Hodges and Robards 1982). The percentage of previously harvested bald eagle habitat is listed in Table 3-6. There are 141 recorded bald eagle Nests in the planning area.

Table 3 - 6
Percent of PMIS Habitat Harvested through 1987

VCU	Key Winter Range (deer)	Int. Winter Range (deer)	Black Bear	Bald Eagle	Pine Marten	Cavity Nesters	River Otter	Early Stage Species
543	43.8	35.6	11.5	4.4	39.0	10.5	10.6	39.0
544	62.5	80.2	86.4	28.5	71.3	10.5	44.3	71.3
545	88.4	90.3	100.0	62.6	74.3	100.0	83.9	74.3
546	52.6	37.5	49.4	14.2	44.3	49.4	36.9	44.3
555	36.4	42.3	47.2	26.2	20.0	47.2	27.2	20.0
556	30.0	45.2	51.0	18.6	37.3	51.0	19.8	37.3
557	X2.6	56.2	54.4	32.5	51.9	54.4	30.9	51.9
560	37.8	43.3	11.9	23.8	31.5	11.9	20.7	31.5
587	36.1	38.0	37.9	11.7	40.3	37.9	11.4	40.3
Total	49.1	45.3	40.6	23.6	42.9	47.4	27.4	42.9

Endangered, Threatened, and Sensitive Species

Prince of Wales Flying Squirrel

The Prince of Wales flying squirrel was not selected as an MIS for this EIS, but flying squirrels are incorporated into the cavity nesters MIS section. This unique subspecies is endemic to Prince of Wales Island, which is not part of the project area. The flying squirrel was listed as a category 2 species in 1984 and now, based on new information, is listed as a Subcategory 3c species. Subcategory 3c comprises taxa that are considered to be more abundant and/or widespread than previously thought.

Marbled Murrelet

The marbled murrelet, a robin-sized seabird, was listed as a Category 2 species in the January 6, 1989 Federal Register. Category 2 are those species for which available information suggests that listing a species may be appropriate but for which conclusive data on biological vulnerability are not currently available to support listing.

The species is being addressed in this document because of its status, the imminent need for research on the species' habitat requirements and because the species occurs in the project area. The U.S. Fish and Wildlife Service is presently conducting marbled murrelet studies in Alaska. For additional information on the Marbled Murrelet please see the 1989-94 KPC Long-Term Sale FEIS (chapter 3, pages 103-104).

Peregrine Falcon

The endangered Arctic and American subspecies of the Peregrine falcon nest farther north, but could pass over the project area during migration. The Peale's subspecies is not listed as endangered or threatened, but is covered by a provision of "similarity of appearance" which broadens the scope of protection for all Peregrine falcons (USFWS-Alaska 1984). A preliminary survey of Peregrine falcons in southeast Alaska was conducted by the U.S. Fish and Wildlife Service (Schempf 1982). According to this survey, the project area does not contain any known nest sites of the Peale's Peregrine falcon.

Stellers Sea Lion

The Steller's (northern) sea lion has been listed as a threatened species under emergency order authority of the Endangered Species Act (Federal Register 1990). The Steller's sea lion's range extends from coastal areas in Japan through the Aleutian Islands, southcentral Alaska, southeast Alaska and south into California.

The North Sea Otter Sound project area does not contain any known sea lion haulout concentration areas (Alaska Habitat Management Guide Southeast Region 1986). Threatened species are protected from "take" by the Endangered Species Act. The term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct.

Humpback Whale

Humpback whales are common in sea waters adjacent to the planning area. A biological assessment of humpback whales in southeast Alaska has been prepared for humpback whales (Green 1987) and a letter of concurrence was written by NMFS (McVey 1987). No effects to the humpback whale are expected from this project.

Visual

The North Sea Otter Sound area is rich in scenic values having a complex arrangement of open ocean, protected waters, islands, bays and passages.

The scenic qualities of the area have been reduced by past intensive timber harvest. Recent harvest has been heavy on Tuxekan and Marble Island, much of which is highly visible from

marine travel routes. The northeastern corner of the study area, including Tenass and Brockman Pass, remain undeveloped with little evidence of logging.

The extensive older harvest, which is 15 to 40 years old, on Owl, Hoot, Eagle, White Cliff and Kosciusko Islands is still evident to a nearby viewer. From a middleground or background perspective, the regrowth has blended into the surrounding landscape by varying degrees.

One of the major impacts on visual resources arises from the removal of old-growth forest vegetation and the subsequent replacement with a heavy growth of young, second-growth trees. When viewed from a road or marine travel route, these second-growth trees are different in size, texture and color than the old-growth that usually surround them for a period of approximately 50 years. Because many of the forested landscapes of southern southeast Alaska are characterized by an unbroken canopy of old-growth trees, the differences between newly harvested areas and old-growth create a contrast that results in a decrease in scenic quality. As the harvest area grows older the contrast gradually declines until, at an age of 50 to 75 years, the difference becomes unnoticeable from a middleground or background perspective to most observers.

Landscapes are viewed not only from roads, communities and marine travel routes, but also from the perspective of the dispersed recreationists who may be hunting in the woods or fishing along a stream. To some viewers, the scenic qualities associated with the unique values of old-growth forests may be more important than to the person viewing the scene from a distance. Old-growth timber, especially the large, higher volume stands often have exceptionally high scenic qualities for the impressive size and character of the trees and understory vegetation and from the unaltered character of the natural environment. In areas which have been harvested, these values are reduced until, over time, the understory plants are reestablished, the stumps decay and the trees mature. The time required for regrowth to the pre-harvest level of scenic quality is probably about 200 years, although a substantial return is noted after 150 years.

The extension of the timber harvest rotation was established in the Tongass Land Management Plan (TLMP 1979) to provide additional latitude in the design of harvest units in visually sensitive areas. In the North Sea Otter Sound area, which is classified as LUD IV, the rotation will be extended from 100 years to 120 years. The Visual Quality Objective (VQO) of Partial Retention will be implemented in extended rotation areas.

Visual Management System

The Visual Management System has been developed as a tool to manage the scenic resources of National Forest lands. It provides a process for analyzing the lands seen by the public and guidelines on how management activities on a forest can be designed to minimize the visual impacts of these activities on the natural landscape.

The first step in the Visual Management System is to identify areas where people have particular sensitivity for scenic quality. In southeast Alaska, this includes recreation sites, marine travel routes, road corridors, communities and camps. All land masses which are seen from these viewing areas are determined. Then, the overall scenic quality of all the Forest landscapes, based upon the variety in the various physical features that make up the landscapes, is determined.

These components are combined to establish what are known as recommended or initial Visual Quality Objectives (VQOs), which are described in detail below. The initial VQO represents an ideal or benchmark management scheme for a particular landscape based solely on the visual quality values described above. In the land management planning process these Visual Quality Objectives are considered along with other resource values, management concerns and public input to arrive at an adopted Visual Quality Objective for a landscape. The adopted VQO may be the same as the initial VQO or it may be more or less restrictive. As an example, in an area where recreation values are paramount and concern for scenic quality is high, the adopted VQO may require a higher level of scenic quality than the initial VQOs. Conversely, in an area where timber harvest is a priority, the adopted VQO may be less restrictive than the initial VQO.

Visual Quality Objectives

Following is a brief description of the major categories of VQOs:

Retention

Development activities such as timber harvest may occur in an area, but will not be apparent to the casual observer. This could be accomplished by harvest activities which are very small in scale (e.g. 1-5 acres in size). No exposed ground would be visible, and any new lines introduced into the landscape by the edges of the small cuts would be so minimal and dispersed that they would not be easily visible. On gentle slopes, somewhat larger harvest openings might still have low enough visibility to meet this objective. Some harvest method other than clearcutting could be used to meet this objective.

Partial Retention

To meet this objective, harvest activity may be apparent to the observer. However, it would not dominate the surrounding natural landscape features due to the small scale and wide dispersal of the harvest units, or because they so completely blend with natural occurrences in the landscape. Techniques used to attain this objective, in addition to keeping the scale of the harvest small, are hiding unit backlines behind landforms or locating the backline against a muskeg or scrub timber. Other techniques involve replicating the scale and shape of natural openings, such as muskegs or avalanche paths that may be adjacent to the harvest area.

Modification

To meet this objective, harvest or other activities could be very noticeable and would tend to dominate the surrounding natural landscape. However, the activity would be in scale with the surrounding landscape features, though its size would be significantly larger than under partial retention. Techniques used to attain partial retention would also apply to this objective, but the major emphasis would be placed on positioning and shaping the unit so that it blends into the various landforms making up the landscape.

Maximum Modification

To meet this objective, harvest activities would be large in size and so completely dominate the natural landscape that when viewed from a few miles away or closer would appear to be completely out of scale and unrelated to the natural features of the landscape. However, when seen from several miles away, their shape, scope and positioning would appear to a degree to be related to the natural features in the landscape.

Sensitivity Levels

A major factor in establishing VQOs is evaluating the sensitivity people have for scenic qualities of the area. Called Sensitivity Levels, this inventory is based on two factors - the number of people who see the area and their sensitivity for scenic qualities. The ratings range from 1 (highest sensitivity) to 3 (lowest sensitivity or unseen). A sensitivity level inventory was done for the study area in 1980 and was re-evaluated during the planning process for this FEIS, as part of the directed update of VQOs in the Area Analysis process.

The travel routes of El Capitan and Tuxekan Passages and from Karheen Pass north to Tokeen and west to Cape Pole were rated in the original inventory as being average in scenic sensitivity (Sensitivity Level 2). The remainder of North Sea Otter Sound was rated as Sensitivity 3 (lowest sensitivity or unseen). There were no areas rated Sensitivity Level 1 (highest sensitivity) in the study area.

Some Sea Otter Sound residents have suggested the need for reappraisal of the Sensitivity Level inventory. They have expressed concern for scenic quality and increased recreation use resulting from the State land sale in Naukai.

It should be noted that sensitivity levels are but one component of the inventory for VQOs and do not result in management direction for visual resources. The following table shows the original 1980 and new sensitivity levels for the project area.

Travel Route	New rating	Old rating
Tuxekan Pass, Tonowek Narrows to Tenass Pass	1	2
Tuxekan Pass to Edna Bay	1	2 & 3
Karheen Pass to New Tokeen	1	2
New Tokeen to Brockman Pass	2	3
Cyrus Cove anchorage	1	3
Skookumchuck	1	3
White Cliff Pass through Marble Pass	2	3
Tenass and Brockman Passages	2	3
Tokeen Bay, Davidson Inlet	2	3
Sea Otter Sound to Cape Pole	2	2

These changes in Sensitivity Levels will change the inventoried VQOs for the area. The VQOs in foregrounds along Level 1 travel routes will change from partial retention to retention. This means that any activities occurring in the area should not be evident. In the foreground along Sensitivity Level 2 travel routes, the VQOs will change from modification to partial retention. This means that alterations may be evident but not obvious. Corresponding changes will occur in the middleground and background.

Lifestyles

Settlements affected by activities in the project area include: Edna Bay and Cape Pole on Kosciusko Island, Tokeen on El Capitan Island, Marble Pass on Marble Island and Nichin Cove on Tuxekan Island. These settlements range in size from one person living in a sheltered bay to approximately 29 families residing in the community of Edna Bay. Although Edna Bay and Cape Pole are on forest road systems, the settlements are accessed primarily, if not exclusively, by boat or float plane. This degree of remoteness is highly valued by commercial fishermen and loggers alike who move to the area to get away from urban problems, be close to a wilderness environment, be their own boss and enjoy the solitude. Many residents believe the area is a better place to raise their families and are quick to point out the quality of life found in these areas outweigh the possible disadvantages of seasonal employment, lack of jobs, high cost of importing goods and services, transportation, etc.

The settlements have little or no local economy in the conventional sense. They serve as homesites for commercial fishermen or camps for local loggers. The economy is highly seasonal and fluctuates with current markets. Having a minimum of local economic activity, there is a heavy reliance on local fish and game resources. Sources outside the community play a major role in supplying goods and services that cannot be obtained from local subsistence.

Subsistence

For thousands of years, Alaskans have depended upon hunting, fishing, and gathering of plants and materials as part of their livelihood. Without those activities, life would have been impossible. Even today, when more than half of the population resides in urban areas, hunting, fishing, and gathering activities represent a major focus of life. Subsistence activities are conducted for a variety of reasons including: continuing a way of life, maintaining and continuing a cultural heritage, and because of economic necessity.

The importance of subsistence is recognized in both State and Federal law. The most important Federal law dealing with the subject is Title VIII of the Alaska National Interest Lands Conservation Act (ANILCA) of 1980. Because the project area is located on federally managed land, the requirements of ANILCA must be satisfied prior to project implementation.

ANILCA states in Title VIII, Section 802, that "...utilization of the public lands in Alaska is to cause the least adverse impact possible upon rural residents who depend on subsistence use of the resources of such lands consistent with management of fish and wildlife in accordance with recognized scientific principles and the purposes for each unit established, designated, or expanded by or pursuant to Titles II through VII of this Act, the purpose of this title is to provide the opportunity for rural residents engaged in a subsistence way of life to do so."

Under the terms of ANILCA, subsistence is defined as "the customary and traditional uses by rural Alaska residents of wild, renewable resources for direct, personal, or family consumption as food, shelter, fuel, clothing, tools, or transportation."

Section 804 provides that "the taking on public lands of fish and wildlife for non-wasteful subsistence uses shall be accorded priority over the taking on such lands of fish and wildlife for other purposes."

Section 810(a) of Title VIII requires that federal managers determine whether subsistence will be significantly restricted by a proposed action before that action is undertaken. If it appears that the proposed action could significantly restrict subsistence uses, certain measures must be taken before proceeding with the project. One of the measures to be taken is holding formal public hearings to provide subsistence users an opportunity to address their concerns. A Section 810 evaluation cannot be made without an inventory of existing potential subsistence resources and their level of use.

Inventory information was collected in 1988 as part of a cooperative study by the U.S. Forest Service and the Institute of Social and Economic Research, University of Alaska Anchorage. The study, entitled Tongass Resource Use Cooperative Survey (TRUCS) identified the rural communities that depended on the project area for a significant portion of their subsistence needs. Subsistence hearings were held in these communities in June 1990 to determine customary and traditional uses of the resources. A transcript of each hearing is included in the planning record for this FEIS. The following communities were included:

Naukati

This is a native village with a population of approximately 100 on the western edge of Prince of Wales Island. Residents have traditionally used the project area for subsistence activities, primarily fishing and hunting (in 1988, 57 percent of deer harvested were taken within the project area; in 1989 the harvest was 47 percent). There were three local citizens present at the subsistence hearing held at the LPK cookhouse in Naukati on June 20, 1990. The single testimony stated that the project would not have a significant effect on subsistence use.

Point Baker/ Point Protection

These communities are located on the northwest tip of Prince of Wales Island and are comprised of approximately 50 individuals. Important subsistence uses identified by local residents include: deer, bear, furbearers, waterfowl, clams, crabs, salmon, halibut, steelhead, cutthroat, plants, and berries (from 1987 through 1989 none of the deer harvested were taken from the project area). There were two individuals present at the subsistence hearing held at the community building at Pt. Baker on June 22, 1990. Both individuals stated that the project could potentially adversely affect critical anchorages at Cape Pole, Fisherman's Harbor, and Trout Creek. To mitigate this valid concern, the preferred alternative was modified to designate permanent old-growth retention areas to protect these anchorages. Another comment addressed the need to close roads within the project area to protect traditional subsistence use of deer from competition from road hunters.

Edna Bay

This is a commercial fishing village community of about 25 families located on Kosciusko Island. Important subsistence uses identified by local residents include: deer, bear, furbearers, clams, crabs, berries, and timber for firewood and building (in 1987, 63 percent of the deer harvested were taken within the project area; in 1988, 66 percent, and 1989, 64 percent). There were four individuals present at the subsistence hearing held at a local residence in Edna Bay on June 26, 1990. One individual testified that it was essential to keep logging activities 500 feet from anadromous fish streams. Three comments focused on the desire to comment on areas outside the project area. Two individuals stressed the need to make permanent old growth retention on the southwest shoreline of Kosciusko Island: one individual felt old growth would protect the anchorages at Pole Anchorage and at Fisherman's Harbor, while the other individual felt old growth retention would protect the viewshed from the Warren Island wilderness area.

Tokeen

This community is home to approximately 12 individuals. It boasts a lodge and small store. Important subsistence uses identified by local residents include: deer, bear, furbearers, waterfowl, clams, crabs, salmon, halibut, steelhead, cutthroat, plants, and berries (in 1988, 50 percent of the deer harvested were taken from the project area; none were reported taken in 1987 and 1989). Two individuals attended the subsistence hearing held at Tokeen on June 22, 1990. One individual felt the AHMU standards were inadequate, and that inflexible no-cut buffers be implemented throughout the project area—not just adjacent to currently proposed units. It was also mentioned that the TRUCS survey omitted subsistence users living in the west side of Sea Otter Sound. The final comment expressed a desire to have unit 556-6 broken into two smaller units, because it was felt a 4.4 mmbf sale was too large to be handled by any of the local operators.

Thorne Bay

Thorne Bay was a logging camp until 1982, when it was incorporated as a second class municipality. There is an extensive road system available for residents to pursue subsistence activities such as timber harvest for firewood and home building, hunting, trapping, and fishing (none of the deer harvested from 1987 through 1989 were taken within the project area). No individuals attended the meeting held in Thorne Bay on June 21, 1990.

Saxman

This is a native village with a population of approximately 100 on Revilla Island. Residents have traditionally used the project area for subsistence activities, primarily fishing and hunting (none of the deer harvested from 1987 through 1989 were taken within the project area). There were five people present at the subsistence hearing held at the Saxman Town Hall on June 19, 1990. One individual, testifying as the Saxman subsistence commissioner, stated the need to maintain 300-foot buffers along anadromous fish streams, to close new logging roads after completion of timber haul, to eliminate clearcutting, to curtail commercial fishing, and to not build any more Forest Service recreation cabins.

Wrangell

Located on Wrangell Island 100 miles by boat north of the project area, this is a community of approximately 1500 individuals. Important subsistence uses identified by local residents include: deer, bear, furbearers, waterfowl, clams, crabs, salmon, halibut, steelhead, cutthroat, plants, and berries (none of the deer harvested from 1987 through 1989 were taken within the project area). No individuals attended the hearing held in Wrangell on June 25, 1990.

Timber

The project area is part of the coastal temperate rain forest. Commercial species are Sitka spruce, western hemlock, western red cedar, Alaska cedar and mountain hemlock. Noncommercial species include lodgepole pine, red and Sitka alder and cottonwood. For a more detailed description of the timber and vegetation characteristics, see the Southeast Alaska Area Guide, the Forest Ecosystem of Southeast Alaska (Vols. 7 and 9) and the Final Environmental Impact Statement for the Tongass Land Management Plan.

Timber productivity is generally very high in the project area. Variables used in southeast Alaska for measuring productivity are site index and volume class. Site index is an estimate of the height trees will attain on a given site at the age of 100 years. Volume class is an estimate of harvestable volume per acre as follows:

Volume class 4	10-14 mbf/acre
Volume class 5	15-25 mbf/acre
Volume class 6	26-40 mbf/acre
Volume class 7	over 40 mbf/acre

Site index calculated from soil types shows that 61 percent of the commercial forest land (CFL) has a high site index (greater than 135). Approximately 38 percent has a moderate site index (90 - 135), and a minor amount has a low site index (less than 90). Approximately 54 percent of the remaining CFL has a high volume class timber (6 or 7) and 46 percent has lower volume class timber (4 or 5).

Table 3-7 displays the acres of the remaining old-growth commercial forest land and Table 3-8 displays volume class distribution.

In old-growth timber, general averages for stand species composition in southeast Alaska show Western hemlock comprises 64 percent of the stand stocking with Sitka spruce comprising 28 percent and the cedars comprising 8 percent (Ruth and Harris 1979). Generally, as the spruce component increases in a stand, the volume increases. Therefore, on the higher volume mixed hemlock-spruce stands of North Sea Otter Sound, the estimated composition is approximately 55 percent hemlock, 40 percent spruce and 5 percent cedar.

Table 3 - 7

Acres of Remaining Old-Growth Commercial Forest Land by Volume Class

Mgmt. Area	VCU	Vol. Class 4	Vol. Class 5	Vol. Class 6	Vol. Class 7	VCU Total	Mgmt. Area Total
KO4	555	2211	4255	1214	343	8023	8023
KO5	543	404	1096	2934	2274	6708	
	544	29	478	413	605	1525	
	545	52	614	578	174	1418	
	546	317	751	1539	993	3600	
							13,251
KO7	556	450	1146	1107	521	3224	
	557	210	817	628	279	1934	
	560	191	855	1190	1243	3479	
	587	146	597	567	718	2028	
							10,665
Totals		4010	10,609	10,170	7150	31,939	31,939

Table 3 - 8

Timber Volume (MBF) of Remaining Old-Growth CFL by Volume Class

Mgmt. Area	VCU	Vol. Class 4	Vol. Class 5	Vol. Class 6	Vol. Class 7	VCU Total	Mgmt. Area Total
KO4	555	30,924	106,375	48,560	17,150	203,039	203,039
KO5	543	5,656	27,400	117,360	113,700	264,116	
	544	406	11,950	16,520	30,250	59,126	
	545	728	15,350	23,120	8,700	47,898	
	546	4,438	18,775	61,560	49,650	134,423	
							505,563
KO7	556	6,300	28,650	44,280	26,050	105,280	
	557	2,940	20,425	25,120	13,950	62,435	
	560	2,674	21,375	47,600	62,150	133,799	
	587	2,044	14,925	22,680	35,900	75,549	
							377,063
Totals		56,140	265,225	406,800	357,500	1,085,665	1,085,665

Dead and dying tree crowns and snags are generally common to old-growth stands. Individual over-mature trees contain varying amounts of internal wood decay. This decay could affect up to 50 percent of the tree volume.

Dwarf mistletoe is a major parasite on hemlock in many old-growth stands. Annual loss of growth and reduction in wood quality is unknown, but mistletoe tends to weaken the tree, making it vulnerable to other diseases.

Hemlock sawfly infestation has increased dramatically in recent years. It peaked in 1983 with 62,000 acres of defoliation in southeast Alaska. Most of the damage in southeast Alaska occurred on Prince of Wales Island. Several areas of defoliation have occurred on Tuxekan and Kosciusko Islands. In these areas, 10-50 percent of the hemlock had top-kill or mortality, although the majority of the infested trees in the area survive.

Black headed budworm is present in a small second-growth stand on Tuxekan Island. One second-growth spruce-hemlock stand near Survey Creek on Kosciusko Island has also shown heavy defoliation due to Hemlock sawfly.

Approximately 49 percent of the original old-growth forests within the project area have been harvested. Most of the timber harvest was by downhill highlead yarding with conventional truck haul to the LTF. Some shore line areas were harvested via an A-frame logging system.

Approximately 32 percent (24,037 acres) of the total land base is composed of second-growth stands. Of these stands, 5,400 acres would become available for precommercial thinning (age class 12-18) during the 10-year planning period. To date, 7,255 have been precommercially thinned.

Composition of species in second-growth varies from unharvested stands. District data shows that the spruce component has increased 10 to 40 percent in second-growth stands, compared to the original old-growth composition.

The old-growth stands in the study area have produced a variety of high value products. During World War II, Sitka spruce was highgraded for airplane stock. Currently, its light weight and tightly-grained qualities are highly valued for instrument sounding boards and structural beams.

Soils and Hydrology

The primary soils in the area are members of the Ulloa-Sarkar complex. The Ulloa series consists of deep, well-drained soil over calcareous bedrock. The Sarkar series also occurs over calcareous bedrock, but the soil is shallow and moderately well to well drained. These mineral soils comprise approximately 50 percent of the area and are highly productive.

About 20 percent of the area contains soils of the Kina-Maybeso complex. The Kina series is unforested and consists of very deep, poorly and very poorly drained soil. The Maybeso series, which is a forested organic soil, is likewise very deep and very poorly drained. The remaining 30 percent of the area varies widely in soil characteristics with approximately 5 percent of the area classified as wetland. No activities are planned on wetland sites.

Slope gradients are generally less than 75 percent. Slope stability, erosion potential and sedimentation are typically low to moderate although significant areas on Marble Island and in the northern part of the Management Area on Kosciusko Island have moderate to high hazards.

The climate and weather of the Sea Otter Sound Area has a strong maritime influence. This influence produces heavy amounts of precipitation ranging from 80 to 140 inches per year. Watershed discharge in relation to timber harvest in southeast Alaska tends to be highly variable at best. Changes in streamflow or discharge may begin when 18 to 35 percent of the drainage area is modified by tree removal in a short time.

Previous activities, especially timber harvest and road building, have effects on water quality in the form of suspended and bed loading. Stream temperature is also affected by the removal of streamside vegetation. Watershed discharge, suspended and bed loading and stream temperature all affect water quality, which in turn has direct effects on fisheries spawning and rearing habitat. Although the study area has been extensively logged and roaded, water quality is good to excellent.

Recreation

Sea Otter Sound has recreation resources with high scenic value, rich marine fisheries and well protected small boat waterways. The area is well suited to recreational boat touring and fishing and is used by local residents for recreation. Sea Otter Sound is also visited seasonally by commercial and recreational fishermen, cruisers and hunters.

While there are no developed recreation sites in the study area, there are two developed recreation sites, Staney Creek and Shipley Bay cabins, which are located just outside the study area boundary and may be affected by proposed activities. There are numerous undeveloped sites that receive use by local residents and tourists. These include areas used for subsistence gathering of forest and marine resources, beachcombing, and especially scenic or unique attractions having good campsites and anchorages. These areas have been identified and will be given special consideration when planning timber sales or other activities.

The proposed State land sale at Naukati will likely bring many new residents to the area. It is anticipated that many of the new land owners will be using their sites as second homes or

vacation retreats. The future construction of a public boat ramp near Naukati will provide access to waters of the Sound by recreationists from the Prince of Wales road system.

Of special concern to some area residents and visiting recreationists is preservation of reliable small boat anchorages. It is felt that timber harvest or other activities around anchorages may reduce their security in strong winds and their attractiveness as recreation sites.

The Recreation Opportunity Spectrum (ROS) is a method used to evaluate the types of recreation which might occur in an area. The ROS considers the factors which affect a recreation experience - remoteness from civilization, levels of human use, and evidence of humans (e.g., roads, communities, timber harvest, boat traffic, etc.), to describe areas of land in terms of what type of recreation experience they provide. Terms which range from Primitive on one end of the spectrum to Urban on the other end of the spectrum are used to describe these varying recreation experiences. Following is a summary of each of the seven ROS categories.

Recreation Opportunity Spectrum (ROS)

Primitive

An essentially unmodified natural environment, remote from the sights and sounds of human development or activity. Use is generally low. Favors backcountry types of recreation such as hiking, canoeing and kayaking, exploring, etc. Cabins or shelters are rare.

Semi-Primitive Non-Motorized

A predominately natural environment, where the sights and sounds of human development or activity may be only occasionally apparent. Use is generally low and motorized use is rare. Includes less traveled marine travel routes. Favors backcountry types of recreation such as hiking, canoeing, kayaking, exploring, etc. Cabins or shelters blend into natural environment.

Semi-Primitive Motorized

A predominately natural environment, where the sights and sounds of human development or activity may be apparent. Use is generally low although low-use roads and motorized use may be present. Includes major marine travel routes. Favors both backcountry and dispersed motorized types of recreation such as hiking, motorboating, off-road vehicles, etc. Cabins or shelters blend into natural environment.

Roaded Natural

A predominately natural environment, where the sights and sounds of human development or activity are often apparent. Timber harvest or other activities are apparent but harmonize with natural environment. Use is low to moderate and motorized use may be common. Includes major roads where timber harvest or other activities have not visually altered the natural landscape. Favors dispersed motorized types of recreation such as car and R-V touring and camping and concentrated motorboating.

Roaded Modified

A predominately modified environment, where the sight and sound of human development or activity are often apparent. Timber harvest or other activities may visually dominate the natural environment. Use is low to moderate and motorized use may be common. Includes major and minor roads and marine travel routes where timber harvest or other activities have visually altered the natural landscape. Favors dispersed motorized types of recreation such as camping, hunting and fishing.

Rural

A predominately modified natural environment, where the sight and sound of human development or activity are usually apparent. Human developments dominate the the natural environment. Use is moderate to high and motorized use in common. Includes areas of dispersed settlement and heavily used recreation sites. Favors concentrated motorized recreation such as developed camping, marinas, etc.

Urban

A substantial urbanized environment, where the sight and sound of human development or activity are always apparent. Use is high and motorized use is common. Includes communities or very heavily used recreation sites. Favors highly developed and heavily used types of development.

The majority of North Sea Otter Sound falls within the more developed end of the spectrum (ROS class roaded/modified) due to the intensive timber harvest and roading which has occurred. The northwest portion of the study area, however, including Tenass and Brockman Pass and parts of Tokeen Bay, remains relatively undeveloped and primitive (ROS class semi-primitive/non-motorized). The primitive state of these areas contributes to the diversity of recreation opportunities in the Sound.

Cultural Resources

Although only a portion of the intricate coastline surrounding Sea Otter Sound has been archaeologically surveyed, the area contains a very high density of known cultural resources. Previous investigations have provided a great deal of significant information about the prehistory of the west coast of Prince of Wales and the offshore islands. Native people have lived in the area for at least 9000 years, and most recently it was the home of the Henyakwan Tlingit. The high density of known prehistoric sites suggests that the area supported a large population.

The most prominent Henyakwan village in the study area was Tuxekan, which is said to mean "Coast Town" (Emmons n.d.). Tuxekan may have been among the most ancient, continuously occupied Tlingit villages in Southeast Alaska (Rabich Campbell 1983). In 1886, a visitor noted that there were 19 houses at Tuxekan. If one uses figures from Dawson (1880), that minimally there were 13.5 persons per household, this means that the community supported a population of at least 256 people.

A saltery was established at Deweyville by Fred Brockman in 1887. A cannery was also established at Karheen about 1914 (Orth 1967) that consisted of a complex of warehouses, the cannery proper, docks, bunkhouses, cabins for management, and 14 Native cabins.

A short-lived flurry of mining activity also occurred in 1909 at Tokeen, on Marble Island by the Great American Marble Company. The operation continued until 1929 but was not permanently closed until 1932. Many of the buildings were floated to New Tokeen, on El Capitan Island, where they were placed on pilings. This has been a fish buying station for several years.

There are 51 known and reported sites on Forest Service lands in the vicinity of the project area. Although a number of sites have been identified, large blocks of the landscape remain to be surveyed and a number of additional significant prehistoric and historic sites can be expected to be discovered. These may include village sites, shell middens, cemeteries, fish weirs, cabins, trails, and other features or objects resulting from previous human activity. During the planning process, the sale design was established to avoid any direct impacts to the known cultural resource sites in the vicinity.

Minerals

The North Sea Otter Sound area has a scarce history of mineral exploration and discovery. Most mineral entries have been for common variety minerals such as marble. There is some mineral exploration occurring in the area. Exploration and discovery activities are closely tied to price fluctuations in locatable and common variety minerals.

The Department of the Interior Bureau of Land Management has jurisdiction regarding minerals and subsurface rights. The USDA Forest Service is the principal surface manager in the North Sea Otter Sound area and must be made aware of any mineral exploration and discovery on the National Forest. It is national policy to foster and encourage the orderly use and development of mineral resources on the national forests.

A by-product of timber harvest activities is road accessibility. Accessibility could make mining of marginal value deposits more economical.

Log Transfer Facilities

The transportation of the harvested timber requires that the timber be removed from trucks, placed in the water and rafted to sort yards or mills outside the project area. Processing mills are located at Klawak on Prince of Wales Island and Ward Cove on Revillagigedo Island.

The project area contains existing, inactive LTFs on numerous islands. Most of these will not be considered for reactivation and will not be discussed further in this FEIS. There are four log transfer sites (Edna Bay, West Orr, Nichin Cove, and Cape Pole) that are essential to timber harvest operations within the project area. All will require renovation or modification prior to use. No new log transfer sites will be needed providing the proposed modifications will be allowed in the various State and Federal permitting processes. The existing sites were established prior to implementation of the the inter-agency siting guidelines. However, those sites being considered for reactivation do meet the guidelines adequately.

Table 3-9 shows all existing LTF sites in the project area.

Table 3 - 9

Developed Log Transfer Facilities

Location	Active	Inactive	Abandoned	Ownership
Cape Pole		X		USFS/Pv
Eagle Island		X		USFS
East Orr			X	USFS
Edna Bay		X		USFS
Hoot Island		X		USFS
Marble East		X		USFS
Marble North			X	Pvt
Nichen Cove		X		USFS
Owl Island		X		USFS
Point Hardscrabble			X	USFS
South Orr E.			X	USFS
South Orr W.			X	USFS
Tokeen Cove E.			X	Pvt
Tokeen Cove W.			X	Pvt
West Orr		X		USFS
West Tuxekan			X	USFS
White Cliff Island		X		USFS

Transportation System

The transportation system in the study area consists of isolated road networks on the individual islands. Road systems were developed in the mid 1950's with later systems developed on Kosciusko, Orr, Tuxekan and Marble Islands. Currently the Kosciusko roads are used for hunting, recreation, firewood gathering, and transportation of goods and equipment between Cape Pole and Edna Bay.

The transportation system of the project area can be broken into several categories: (1) air; (2) marine waterways; and (3) Forest development roads.

Air Transportation

The project area is served by air taxi operators from Ketchikan, Wrangell and Petersburg. Air service is intermittent in nature.

Marine Waterways

Marine waterways serve as barge and boat routes to and from the project area. Barge service is intermittent in nature. Often Cape Pole serves as a barge delivery point from Wrangell and other outside points rather than Edna Bay, as this reduces the tow time and distance than if deliveries were made in Edna Bay.

Forest Development Roads

The Forest transportation system includes three types of roads: (1) arterials, (2) collectors and (3) locals.

1. Arterials are primary roads which connect communities and provide main access into the Forest.
2. Collectors are secondary roads accessing smaller land areas and generally provide the linkage between Forest arterial, public or other Forest collector roads, and the remainder of the road system.
3. Local roads serve as the terminal roads or provide minor linkages with other roads,

Table 3-10 shows the amount and class of existing roads in the project area.

Table 3 - 10

Existing Forest Development Roads

Class	Miles
Arterial	11.3
Collector	56.8
Local	160.3
Total	228.4

Chapter 4

Environmental Consequences

Chapter 4

Environmental Consequences

The purpose of this chapter is to analyze the significant physical, biological, economic, and social effects likely to result from implementation of each of the alternatives. This analysis forms the scientific basis for the comparison of the alternatives. The chapter is organized so the environmental consequences respond to the issues, concerns, and opportunities presented in Chapter 1.

Procedures, strategy, and assumptions used to measure the consequences can be found in the planning records available at the Ketchikan Area Forest Supervisor's Office. Most issues are divided into four categories: general consequences common to all alternatives, specific consequences of each alternative, cumulative effects resulting from past activity and that proposed by various alternatives, and anticipated long-term effects.

Issue 1 – Effect of Timber Harvest on Populations of Anadromous Fish

General Consequences

Each of the action alternatives has the potential for impacting the aquatic habitat on National Forest lands in the North Sea Otter Sound project area. Similarly, actual harvest activities completed on private lands could impact streams on those lands. The level of impact, if any, is dependent upon the application of Best Management Practices (BMPs) and Aquatic Habitat Management Units (AHMU) Standards and Guidelines. Timber harvest adjacent to streams may affect water temperature, sedimentation, and large organic debris (LOD) recruitment; road construction and use may cause increased sedimentation; and installation of road crossings could alter or eliminate access to anadromous fish habitat. Timber harvest and road construction guidelines are applied on National Forest lands to minimize each of the potential impacts. Similarly, adherence to the State Forest Practices Act on private land will minimize potential impacts to streams.

The potential for fisheries impacts increases as the disturbance increases along streams. In the proposed North Sea Otter Sound project area, no timber harvest activities immediately adjacent to Class I, II, or III streambanks are proposed in action Alternatives 2, 3, 4, and 5. Rather, buffers of 50 to 500 feet in width would be left adjacent to streams where harvest takes place on National Forest lands according to the Aquatic Habitat Management Handbook (USDA Forest Service 1986a) to mitigate any potential impacts. Table 4-1 shows the width and length of buffers along Class I, II, and III streams for each action alternative. The location of the proposed harvest units in relation to the Class I, II, and III AHMUs for the preferred alternative can be seen on the Alternative Maps provided with the FEIS. The maps show more clearly where the streams are located and where breaks between stream classifications occur. The positions and locations of harvest units on private land are not known.

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Table 4-1

Buffer Width and Distance Along Streams (Feet)

Alternative	VCU	Unit No.	Class I Buffer		Class II Buffer		Class III Buffer	
			Width	Distance	Width	Distance	Width	Distance
2	544	2	—	—	*var	1200	—	—
		3	—	—	**var	1500	—	—
	546	7	100	**1300	—	—	—	—
		8	—	—	var	2600	—	—
	556	4	100	1300	—	—	—	—
	560	2	100	1300	—	—	—	—
Total Distance				3900	5300		0	
3	544	2	—	—	100	1200	—	—
		3	—	—	**100	1500	—	—
	556	4	300	1300	—	—	—	—
	560	2	300	1300	—	—	—	—
	Total Distance				2600	2700		0
4	544	2	—	—	100	1200	—	—
		3	—	—	100	1500	—	—
	556	4	var	1300	—	—	—	—
		6	—	—	100	2000	—	—
	560	2	var	1300	—	—	—	—
Total Distance				2600	4700		0	
5	543	6	—	—	—	—	var	1800
	544	2	—	—	var	1200	—	—
		3	—	—	var	1500	—	—
	546	7	100	**1300	—	—	—	—
	556	4	100	1300	—	—	—	—
	560	2	100	1300	—	—	—	—
	Total Distance				3900	2700		1800

* var = variable width buffer 50 to 500 feet on Class II and Class III streams; 100 to 500 feet on Class I streams

** both sides of AMHU buffered

Source: NSOS Project Area Planning Record

The proposed construction of new roads that will require application of site-specific prescriptions listed in the AHMU Handbook are summarized by alternative in Table 4-2. New roads that would parallel Class I streams range from 0 miles for Alternatives 1, 3, and 4 to 0.3 miles for Alternatives 2 and 5. New roads that would parallel Class II streams range from 0 miles for Alternatives 1, 2, 3, and 4 to 0.1 miles for Alternative 5.

Conclusions for Fish Habitat Effects

The potential project effects of the proposed alternative timber harvest plans and associated road construction plans on aquatic habitat, which includes anadromous spawning and rearing habitat, should be minimal or eliminated by the application of the Forest Service standards, guidelines, and site-specific prescriptions described in the AHMU Handbook. The Handbook provides standard prescriptions that are designed to protect water quality and the productivity of fish habitat. The standards and guidelines define management goals and habitat protection prescriptions organized by AHMU classes.

Table 4-2

Miles of Streams with AHMU Protection Measures by Stream Class (*)

Alternative	VCU	Miles in AHMU	
		Class I	Class II
2	543	0	0
	544	0	0
	545	0	0
	546	0.3	0
	556	0	0
	560	0	0
	Total	0.3	0
3	543	0	0
	544	0	0
	546	0	0
	556	0	0
	557	0	0
	560	0	0
	587	0	0
	Total	0	0
4	543	0	0
	544	0	0
	545	0	0
	546	0	0
	556	0	0
	560	0	0
	Total	0	0
5	543	0	0.1
	544	0	0
	545	0	0
	546	0.3	0
	555	0	0
	556	0	0
	557	0	0
	560	0	0
	587	0	0
	Total	0.3	0.1

(*) Source: North Sea Otter Sound Planning Record

Class I AHMUs have the most specifically defined, restrictive direction, and Class II and Class III are less restrictive. The prescriptions are organized into three levels including: (1) temperature sensitivity constraints; (2) management prescriptions involving large woody debris, water quality, streambank and channel stability, fish passage, and special road construction; and (3) management opportunity prescriptions to increase primary and secondary productivity. The prescriptions for temperature sensitive streams such as Trout Creek in VCU 543 are examined first to determine possible management options since these prescriptions are overriding in importance. Management prescriptions for temperature sensitive streams, if applied, preclude some of the other prescriptions listed for other aquatic habitat concerns. Prescriptions for fish

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passage through stream crossing structures are guided by an economic analysis, which compares the fish resource to the additional expenses required to provide passage.

Within the project area there may be small streams which contain fish habitat which have not been documented and have not been identified on planning maps. Some of these streams may support populations of anadromous rearing and spawning fish and resident trout.

Potential project impacts to fish production as a result of the proposed alternative timber harvest plans are unlikely or would be undetectable. This conclusion is based on the following:

- Measurable changes in stream temperatures will be avoided through the use of site-specific AHMU Handbook stream buffer prescriptions.
- The amount of aquatic habitat affected is relatively small because there will be minimal entrance into Class I and Class II habitat.
- The amount of acreage proposed for harvest by VCU is minimal which will result in only small increases in the total percent of harvest in each VCU (Table 4-3).
- It is unlikely aquatic habitats would be impacted because of site-specific management prescriptions described in the AHMU Handbook.

Cumulative Effects

Past forest management has resulted in extensive timber harvest in the project area. The prime indicators of the effects of management activities are acres harvested, new road construction, and stream crossings.

To date, approximately 32 percent of the overall landbase within the project area has been harvested. Alternative 1 does not harvest any additional acreage; Alternative 2 harvests an additional 0.9 percent of the landbase over the next decade, Alternative 3 an additional 1.3 percent, Alternative 4 an additional 1.5 percent, and Alternative 5 an additional 3.1 percent. Alternative 1 does not contribute to negative cumulative effects, Alternatives 2-5 contribute only slightly.

Table 4-3
Percentage of VCU Harvested Through 2000 (*)

VCU	<i>Alternative</i>				
	1	2	3	4	5
543	27%	27%	28%	28%	31%
544	54%	56%	56%	57%	57%
545	61%	62%	61%	62%	63%
546	26%	27%	26%	28%	29%
555	14%	15%	15%	15%	15%
556	29%	30%	31%	31%	31%
557	50%	50%	53%	52%	52%
560	27%	28%	30%	29%	32%
587	31%	32%	32%	33%	34%
Total	32%	32%	33%	33%	35%

(*) Source: North Sea Otter Sound Planning Record

There are currently 228 miles of inventoried roads within the project area. Alternative 1 does not propose any additional road construction. Alternative 2 builds an additional 4.5 miles of new roads over the next decade, Alternative 3 an additional 5.0 miles, Alternative 4 an additional 6.7 miles, and Alternative 5 an additional 18.0 miles. Alternative 1 does not contribute to negative cumulative effects. Alternatives 2-5 contribute only slightly.

There are currently 96 stream crossings (including Class I, II, and III) within the project area. Alternative 1 does not propose any additional stream crossings. Alternative 2 proposes an additional 3 crossings, Alternative 3 an additional 3, Alternative 4 an additional 3, and Alternative 5 an additional 6.

Mitigation

Another major tool in fisheries management is stream survey and habitat enhancement projects. Stream surveys inventory watersheds, including portions which were affected by previous harvest activities and identify areas which would be suitable for enhancement projects. Enhancement projects include rock gabion (wire mesh cage filled with rocks) and log sill placement to provide pool and riffle habitat, spawning gravel collection areas, etc. Alternative 1 provides for no stream surveys and enhancement projects. Alternatives 2-5 all provide for stream inventories to identify enhancement opportunities in the following streams:

- Karheen system
- Vans Sant
- Charley Creek
- Survey Creek
- Trout Creek
- South fork of Trout Creek

Issue 2 – Effect of Timber Harvest on Old-Growth Dependent Wildlife

General Consequences

Effects of timber harvest on wildlife and wildlife habitat vary depending upon individual wildlife species requirements and the location, extent and type of the harvest. Once a site has been clearcut, forest development follows predictable stages of succession back to old-growth, if given enough time (i.e., 200+ years). Forage (availability and quality) and cover (hiding and thermal) are the primary habitat components affected by these changes. Evaluation of the effects, both positive and negative, from timber harvest must be made in relation to changes in the availability, abundance and distribution of these habitat components for each wildlife species over time.

Old-growth Prescription Areas

There are many significant values associated with old growth forests, such as biological diversity, wildlife and fisheries habitat, recreation, aesthetic, soil productivity, water quality, and timber. The Tongass Land Management Plan (TLMP) withdrew some of the operable commercial forest for resource coordination needs, principally for wildlife and fish which depend upon old growth habitat for their survival. The withdrawn areas are called “old-growth prescription” areas. No timber harvest will be permitted within old-growth prescription areas, with the possible exception of salvage of major catastrophic windthrown or insect-killed timber.

The Tongass Land Management Plan estimated that 4103 acres of operable commercial forest land (CFL) would need to be withdrawn from the operable timber base of the project area to meet other resource needs. For additional information on old growth prescription areas, please see the 1989-94 KPC Long-term Sale FEIS (Appendix Q, page 398). The majority of the old-growth prescription areas would be established in volume class 6 and 7 stands within the various wildlife habitat management units. Some volume class 4 and 5 stands were included to maintain continuous habitat or where noted use was occurring. Table 4-4 lists the proposed old

growth prescription acres for the project area by alternative and the Tongass Land Management Plan acres.

Table 4-4

Proposed Wildlife Old-growth Prescription Acres

VCU #	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	TLMP
543	0	971	815	971	971	1133
544	0	331	0	671	331	276
545	0	0	407	0	0	109
546	0	649	1619	703	618	487
555	0	1500	1127	1410	1142	521
556	0	238	567	213	213	493
557	0	448	478	362	362	239
560	0	1392	610	1392	1392	423
587	0	402	141	402	363	422
Total	0	5931	5764	6124	5392	4103

Management Indicator Species (MIS)

Management Indicator Species (MIS) are species of vertebrates or invertebrates whose population changes are believed to indicate the effects of land management activities. The MIS are used to establish the requirements for maintenance of population viability and biological diversity and to establish management goals for species in public demand.

The acres of proposed old-growth prescription by alternative are listed in Table 4-4. Acres and percentage of harvest in MIS habitat per alternative are listed in Tables 4-5 and 4-6. Acres and percentage of habitat harvested through the year 2000 for all MIS are listed by alternative in Tables 4-7 and 4-8. For each MIS, effects analysis is discussed for current conditions and the year 2000. General projections for the year 2040 are listed.

Sitka Black-tailed Deer

Sitka black-tailed deer were selected as an MIS because they are an important game and subsistence species. The species occurs throughout the project area, but the numbers are anticipated to be at a reduced level in VCUs 544, 545, 546, and 547. Intensive previous harvest occurred in these VCUs and they contain extensive stands of forest where the understory forage is not as abundant.

Sitka black-tailed habitat was calculated as acres of key and intermediate deer winter range.

This section will deal with the effects of timber harvest on Sitka black-tailed deer habitat, with respect to short-term and cumulative effects. Habitat block size was not considered, though fragmentation and roads are known to severely impact deer. On 8/1/89 an Interagency Team of Biologists in Alaska estimated that habitat blocks must be over 1000 acres to be fully effective for Sitka black-tailed deer.

Effects of Timber Harvest

Sitka black-tailed deer populations are highly dynamic and can display large fluctuations (Merriam 1970). The capability of winter habitat to support Sitka black-tailed deer is a function of the overstory (Hanley and Rose 1987; Kirchhoff and Schoen 1987), and climate as influenced by aspect, elevation, and maritime conditions (Hanley and Rose 1987). Deer populations also respond to predation pressure and hunting mortality. Predation by gray wolves is thought to significantly retard the recovery of the deer herd from mortality associated with deep-snow winters (Smith et al. 1986).

In most cases, timber harvest reduces the long-term quality of deer winter range. The combination of deep-snow winters and conversion of large amounts of winter range to second growth can compound the impacts to deer populations. Even under unlogged conditions, a deep-snow winter can kill many deer. Winter severity of an area is a key factor in determining the capability of the land to support deer populations.

Schoen et al. (1985) examined the weather record for southeast Alaska and concluded, "Although weather records indicate that heavy snows can occur throughout southeast, it is difficult to predict when and how frequently such events will occur."

Annual snowfall is a good index of winter severity for deer in southeast Alaska (Flynn and Kirchhoff in prep.). The ADF&G has given a snowfall rating, in terms of typical winter severity, to each VCU in the Tongass National Forest. The VCUs, for this project area, were rated as low snow condition VCUs. Additional details regarding snow depth rates are contained in the 1989-94 KPC Long-Term Sale FEIS (pages 4-194 to 4-197).

USDA Forest Service and ADF&G game biologists have jointly developed a habitat capability model to predict the short- and long-term effects of timber harvest on deer. This analysis uses the information contained in the model and incorporates it in the analysis.

Short-term Effects

Timber harvest converts old growth into early successional shrub and forb stages. Clearcuts 0-15 years old (Yeo 1989) provide abundant forage and improve the opportunity for more deer to enter the winter in good condition, but lack of canopy cover to intercept snow, thereby making herbaceous forage unavailable during intermediate or deep-snow winters.

Today (1991) there are 16,737 acres of key deer winter range. The action alternatives schedule between 2 and 5 percent (370 to 910 acres) of key deer winter range (Tables 4-9 and 4-10).

Today (1991) there are 9,066 acres of intermediate deer winter range. The action alternatives schedule between 2 and 8 percent (169 to 719 acres) of intermediate deer winter range (Tables 4-9 and 4-10).

Cumulative Effects

The cumulative effects analysis assumes the following: 1) adherence to TLMP harvest projections and current placement of old-growth prescription areas, and 2) all operable commercial forest land not in old-growth prescription will be harvested, except portions of areas designated as extended rotation or nonstandard operable. Not all of the old-growth prescription areas will meet the 1,000 acre effective habitat requirement for Sitka black-tailed deer.

Deer habitat capability and deer populations in the project area will be affected by timber harvest. In the long-term, timber harvest converts old growth stands into even-aged, closed canopy stands from 25 through 100 years. The closed canopy stands intercept snow well and provide thermal cover. However, it eliminates preferred browse species and reduces habitat capability for deer.

An important way of analyzing cumulative effects on Sitka black-tailed deer is to consider the area of old-growth prescription which would remain at the end of rotation. Alternative 4 proposes the largest number of acres for old-growth prescription followed by Alternatives 2, 3, and 5 (Table 4-4). The placement of the old-growth prescription is also an important factor to consider in addition to the number of acres. Beach fringe is an important habitat for Sitka black-tailed deer and the location of these areas varies in the alternatives. The cumulative effect of the previous and proposed harvest of beach fringe will have a negative effect on Sitka black-tailed deer populations.

Table 4-7 lists the total acres of Sitka black-tailed deer key and intermediate winter range that would be harvested by the year 2000. The percent of Sitka black-tailed deer key winter range that would be remaining in the year 2000 ranges from 52 (Alternative 1) to 50 for the other alternatives. The percent of Sitka black-tailed deer intermediate winter range that would be remaining in the year 2000 is maintained at 46% for Alternative 1 and ranges from 46 (Alternative 2) to 49 (Alternative 5) (Table 4-8).

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Effects on Deer Hunting

Human use of wildlife resources will be affected by timber harvest activities. On the one hand, timber related employment under the action alternatives will increase the number of hunters and the demand for deer over the no action alternative. Road systems built to access timber will provide vehicle access into the project area and will also increase the demand for deer. On the other hand, timber harvest will cause the habitat capability for deer to decline. Additionally, roads may increase the number of hunters and result in over-harvest. The road systems may increase hunter numbers to the point where there will not be enough deer to satisfy demand. The effects of roading could be decreased, if a road closure program was implemented.

The deer hunter demand level for a particular area and time is hard to project, since hunter use is very dynamic. Hunter use varies with: 1) deer populations, 2) hunter familiarity of the area, and 3) hunter traditions. The ADF&G has designed a process to establish population objectives for deer based on human demand. The process is in its early stages and has not yielded estimates of desired harvest levels.

Black Bear

Black bear was selected as an MIS because it is an important game species. Black bear occur throughout the study area and populations are currently stable (B. Wood Pers. Comm.).

Black bear habitat was calculated as acres of estuary, beach, lakeside and anadromous streamside.

This section will deal with the effects of timber harvest on black bear habitat, with respect to short-term and cumulative effects.

Effects of Timber Harvest

Clearcutting within black bear habitat removes security cover and den sites, thereby reducing habitat capability. Clearcutting within foraging habitat creates highly productive foraging sites and increases habitat capability for about 25 years following timber harvest. After 25 years the conifer canopy closes and forage production declines. Clearcutting reduces the number of future den trees within foraging habitats.

The effects of this level of harvest on black bear habitat capability depends largely upon the timing, spacing, placement, and size of timber harvest units. Black bear habitat capability has been reduced in VCUs 544, 545, 546, and 547 due to the intensity of previous harvest. To maintain black bear habitat capability, the future harvests would need to: (1) provide a continual supply of recent clearcuts throughout time, (2) minimize the amount of black bear habitat in unproductive older second-growth stands at any time, and (3) intersperse the second-growth stands with stands of old growth to provide den sites and security cover adjacent to important riparian and estuarine feeding areas under all alternatives.

Much of the critical black bear habitat estimated to be harvested will actually be retained due to Aquatic Habitat Management Units (AHMU) standards and guidelines for salmon-bearing streams. The AHMU standards and guidelines will maintain security cover and travel corridors for stream fishing black bears. Important general foraging habitats for black bears are in the lower volume stands. Higher volume stands tend to contain less black bear food. A positive impact on black bears is expected for the short term, due to the additional forage found in clearcuts (from 0-25 years of age). Den trees might be a limiting factor in the short and long term because snags were not retained in the areas of extensive previous harvest. Leaving snags in the proposed harvest units would assist in mitigating, but not compensate for the shortage due to previous harvests.

Road construction and increased human activity will increase the harvest opportunities and demand for black bear. Road construction associated with each alternative would increase hunter access to black bear habitats. The increased human activity and access will increase Black bear mortality due to legal harvest, illegal harvest, and removal of nuisance bears. The increases in access and hunter harvest would be greatest under those alternatives with the most

extensive roading. Alternative 5 constructs the largest amount of new road followed by Alternatives 4, 3, and 2. The increased harvest may depress local black bear populations. Because the proposed road system is considered an isolated road system, the anticipated effect of roads would be less than if the roads connected to large communities. The effects of roading could be decreased, if a road closure program was implemented.

Effects of garbage dumps in association with logging camps and rural communities has been identified as a cause for increased bear mortality. The USDA Forest Service participated in drafting a joint policy (see 1989-94 KPC Long-Term Sale FEIS - Appendix Q) statement in 1987 with Alaska Department of Environmental Conservation and Alaska Department of Fish and Game.

The Forest Service will insure, through administration of special use permits, that compliance with the intent of the joint policy statement is met. The Forest Service will continue to cooperate and work with the respective state agencies to resolve problems with habituation of the black bears to humans through garbage dumps.

Short-Term Effects

In 1991 there would be 1,877 acres of key black bear habitat in Alternative 1. The action alternatives harvest between 2.9 and 3.9 percent (55 to 73 acres) of this key habitat (Tables 4-5 and 4-6).

Cumulative Effects

An important way of analyzing cumulative effects on black bear is to consider the area of old-growth prescription which would remain at the end of rotation. Alternative 4 proposes the largest number of acres for old-growth prescription followed by Alternatives 2, 3, and 5 (Table 4-4). The placement of the old-growth prescription is also an important factor to consider in addition to the number of acres. Beach fringe is an important habitat for black bears and the location of these areas varies in the alternatives. The cumulative effect of the previous and proposed harvest of beach fringe will have a negative effect on black bear populations.

Table 4-7 lists the total acres of black bear habitat that would be harvested by the year 2000. Forty-two percent of the black bear habitat would be harvested by the year 2000 (Table 4-8).

Pine Marten

Pine marten primarily require upland old-growth stands for critical stages of their life cycle. They were selected as an MIS to represent old-growth dependent species and because they are important furbearers.

Pine marten habitat was calculated as acres of volume classes 4-7 below 1,500 feet in elevation.

This section will deal with the effects of timber harvest on pine marten habitat, with respect to short-term and cumulative effects. Habitat block size was not considered, though fragmentation and roads are known to severely impact marten. On 8/1/89 an Interagency Team of Biologists in Alaska estimated that habitat blocks must be over 180 acres to be fully effective for marten.

Effects of Timber Harvest

Pine marten prefer habitat with old-growth characteristics. Timber harvest of old-growth habitats reduces pine marten habitat capability. Very little is known of the pine marten's specific habitat requirements in southeast Alaska. However, numerous studies in other locales have shown clearcutting to be detrimental to pine marten populations (Suring et al. 1988a). Clearcutting results in elimination of resting sites, winter hunting sites, overhead cover, and preferred prey species (Campbell 1979). Pine marten avoid advanced second-growth stands, due to low prey densities and the absence of large snags. Pine marten habitat capability and populations are assumed to decline proportionally, with the amount of old-growth habitat harvested.

Roads through pine marten habitat will increase opportunities for trappers to harvest this species. High pine marten populations are usually associated with locales having restricted

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human access, such as roadless areas or where trapping pressure is strictly regulated. Pine marten are easily trapped and their populations are expected to decline given current marten harvest regulations and possible expansion of the road network.

Increased access to pine marten habitat varies under each action alternative. Alternative 1 proposes no new road construction. Miles of road construction for the action alternatives are listed in order of least through the greatest miles of new road respectively: Alternative 2 (4.5 miles), Alternative 3 (5.0 miles), Alternative 4 (6.7 miles), and Alternative 5 (18.0 miles). The increased harvest may depress local pine marten populations. Because the proposed road system is considered an isolated road system, the anticipated effect of roads would be less than if the roads connected to large communities. The effects of roading could be decreased, if a road closure program was implemented.

Short-Term Effects

Today (1991) there are 7,929 acres of pine marten habitat. The action alternatives harvest between 9 and 29 percent (676 to 2,298 acres) of pine marten habitat (Table 4-9 and 4-10).

Cumulative Effects

An important way of analyzing cumulative effects on pine marten is to consider the areas of old-growth prescription which would remain at the end of rotation. Alternative 4 proposes the largest number of acres for old-growth prescription followed by Alternatives 2, 3, and 5 (Table 4-5). The majority of the old growth prescription areas are greater than 180 acres, satisfying the pine marten's effective block size requirements. Some of the old-growth prescription areas will end up being isolated, due to past and future harvesting, and will diminish future population recruitment.

Table 4-7 lists the total acres of pine marten habitat that would be harvested by the year 2000. The percent of pine marten habitat that would be remaining in the year 2000 ranges from 48 (Alternatives 2, 3, and 4) to 51 (Alternative 5) (Table 4-8).

River Otter

The river otter was selected as an MIS to represent riparian habitats and because it is an important furbearer. River otter generally occur in close proximity to anadromous streams, lakes and beach fringe habitats. River otter habitat was calculated as acres of the previously mentioned habitats. Because of the difficulty of analysis, natal denning habitat was not calculated for the project area.

This section will deal with the effects of timber harvest on river otter habitat, with respect to short-term and cumulative effects.

Effects of Timber Harvest

The initial entry into the project area occurred during the 1940s. Beach fringe harvesting occurred throughout the project area. River otters do not utilize beaches with preferred foraging characteristics when these areas are adjacent to clear cuts (Larsen 1983). Five to 20 year old clearcuts were used less than expected by river otters while forested habitats were used in proportion to availability. It is anticipated that the beach fringe portion of the river otter habitat, which was harvested since the 1940s, was not utilized and has been removed from the river otter habitat in this analysis.

Roads through river otter habitats will increase opportunities to harvest river otters, but may also require increased harvest regulations if fur prices rise. A discussion of the relative amount of access created by each alternative is listed in the pine marten section. Where no roads exist there would be less potential for increased harvest or over harvest of river otters. Because the proposed road system is considered an isolated road system, the anticipated effect of roads would be less than if the roads connected to large communities. The effects of roading could be decreased, if a road closure program was implemented.

Short-Term Effect

Today (1991) there are 9,678 acres of suitable river otter habitat. The action alternatives harvest between 1 and 4 percent (86 to 385 acres) of river otter habitat (Tables 4-5 and 4-6). A portion of the river otter habitat has been protected in the fisheries AHMU buffers and in the beach fringe old-growth prescription.

Cumulative Effects

An important way of analyzing cumulative effects on river otter is to consider the area of old-growth prescription which would remain at the end of rotation. Beach fringe is an important part of river otter habitat and it has been proposed for old-growth prescription.

Table 4-7 lists the total acres of river otter habitat that would be harvested by the year 2000. The percent of river otter habitat that would be remaining in the year 2000 ranges from 28 (Alternative 2) to 30 (Alternative 5). In other words, about 68 percent of the original habitat for river otter has been lost by 1990, and an additional 1 to 4 percent will be lost by 2000. The loss of habitat results in decreased habitat capability and populations.

Bald Eagles

Bald eagles were selected as an MIS because the public has a strong interest in the species and because the species has special habitat requirements. The bald eagle and its habitat have been given special protection through the Memorandum of Understanding (MOU) and the Bald Eagle Protection Act.

Effects of Timber Harvest

Bald eagle habitat was calculated as acres of beach fringe and anadromous streamside.

This section will deal with the effects of timber harvest on bald eagle habitat, with respect to short-term and cumulative effects.

Bald eagles prefer large diameter old-growth trees for nest and perch sites. Typical nest trees are at least 400 to 500 years old (Hodges 1982). Removal of perch or nest trees reduces habitat capability. Approximately 50 percent of bald eagle nests are lost to wind related events per 13-year period. Therefore, long-term management of bald eagle habitat requires that alternate nest and perch sites be retained (Suring et al. 1988). It was determined during the formulation of alternatives and selection of harvest units that no nest would be potentially affected. In the event of a new nest being found, harvest units will have boundaries moved to provide a protective buffer around the nest tree in accord with the Memorandum of Understanding between the Forest Service and the Fish and Wildlife Service.

Areas of old-growth prescription will provide alternate nest and perch trees within beach and estuarine habitat. Potential nest and perch trees outside these areas may be harvested during A-frame logging. The extent of impact depends on the amount of beach fringe harvested (break-outs).

Both bald eagle nesting habitats and seasonal concentration areas are vulnerable to disturbance. Whether a given event is significant or not, depends upon the severity of the disturbance and the response of the bald eagle involved. Because bald eagles vary considerably in their response to human activity, it is difficult to predict the effects of a given type of human disturbance on individual eagles (Stalmaster et al. 1985).

The majority of coastal southeast Alaska is without permanent human habitation and residential or commercial developments. Most potential disturbances to bald eagles are associated with road construction, timber harvest, and recreational use of National Forest lands and surrounding waters. Specific activities that bald eagles may be exposed to include boat traffic, car traffic, low-flying airplanes and helicopters, foot traffic, truck and other heavy equipment traffic, surface and subsurface blasting, firearm discharge, and logging. In general these activities, except logging and frequent use of certain roadways, create sporadic rather than prolonged disturbance.

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Under various roading options proposed by the alternatives, there are between 5 and 25 nests within 1/2 mile of proposed roads. These nests will be vulnerable to human disturbance from construction and traffic. The MOU between Fish and Wildlife Service and Forest Service will continue to be implemented.

The proposed units have been designed to avoid bald eagle nest sites and their buffers in all alternatives. The beach fringe, a primary component of the bald eagle habitat, has been proposed for old-growth prescription. The placement of beach fringe in old-growth prescription will allow for the recruitment of future nest sites and perch trees for bald eagles.

Short-Term Effects

In 1991 there would be 9,090 acres of habitat in Alternative 1. Action alternatives schedule between 1 and 4 percent (59 and 358 acres) of bald eagle habitat (Table 4-5 and 4-6.)

Cumulative Effects

An important way of analyzing cumulative effects on bald eagles is to consider the area of old-growth prescription which would remain at the end of rotation. Alternative 4 proposes the largest number of acres for old-growth prescription followed by Alternatives 2, 3, and 5 (Table 4-4). Beach fringe is an important habitat for bald eagles and the location of these areas varies in the alternatives. The cumulative effect of the previous and proposed harvest of beach fringe will have a very negative effect on bald eagle habitat capability and populations.

Table 4-7 lists the total acres of bald eagle habitat that would be harvested by the year 2000. The percent of bald eagle habitat that would be remaining in the year 2000 ranges from 24 (Alt. 2) to 27 (Alt. 4 and 5). In other words, 75 percent of the bald eagle habitat would be harvested.

Cavity Nesters

Cavity nesters/hairy woodpecker were selected as an MIS because of their preference for stands of old-growth western hemlock and Sitka spruce and for their association with snags. As a primary excavator, hairy woodpeckers provide potential nesting cavities, dens, and roosting sites for several secondary cavity nesting species. Hairy woodpeckers require a continual recruitment of snags into the habitat (Menasco 1983; and Goodwin 1983).

Hairy woodpeckers/cavity nester habitat was calculated as acres of operable volume classes 4-7 adjacent to streams, lakes and estuaries. Hairy woodpeckers are not restricted specifically to the previously mentioned habitats, however they do utilize the same volume classes. Habitat block size was not considered, though fragmentation is known to impact hairy woodpeckers. On 8/1/89 an interagency team of biologists in Alaska estimated that habitat blocks must be over 500 acres to be fully effective for hairy woodpeckers.

Effects of Timber Harvest

Hairy woodpeckers require large diameter trees in various stages of decay. Woodpecker densities are assumed to be directly related to snag densities. Current timber harvest activities remove all dead trees within clearcut boundaries, resulting in a decline in snag densities. Snags within harvest units are felled for safety reasons. Hairy woodpecker habitat capability is expected to decline proportionately to the reduction of snag density. The timber harvest eliminates future woodpecker nesting and roosting sites and reduces future use by secondary cavity users. Maintaining snags would be an important mitigation measure to reduce the impacts of harvest on the hairy woodpecker/cavity nesters habitat capability and populations.

The highest density of denning and nesting occurs adjacent to streams, lakes, and estuaries. Some snags would be maintained within areas receiving fisheries prescriptions and within old-growth prescription areas. Populations could change depending upon the number of snags available for nesting.

The effects of roads on the hairy woodpecker/cavity nester habitat should be insignificant, except for areas near communities where snags are cut for firewood. Roads will provide for greater opportunities to observe woodpeckers and other wildlife species.

Short-Term Effects Today (1991) there are 1,402 acres of hairy woodpecker/cavity nester habitat. The action alternatives schedule between 4 and 5 percent (55 to 73 acres) of their habitat (Tables 4-5 and 4-6).

Cumulative Effects An important way of analyzing cumulative effects on hairy woodpeckers is to consider the areas of old-growth prescription which would remain at the end of rotation. Alternative 4 proposes the largest number of acres for old-growth prescription followed by Alternatives 2, 3, and 5 (Table 4-4). Not all of the old-growth prescription areas will meet the 500 acre effective habitat requirement for hairy woodpeckers. The fisheries AHMU buffers would also provide some snags and future recruitment snags along streams, lakes and estuaries. The implementation of a snag retention policy would provide a mitigation for the anticipated reduction in habitat capability.

Table 4-7 lists the total acres of hairy woodpecker/cavity nester habitat that would be harvested by the year 2000. The percent of hairy woodpecker/cavity nester habitat that would be remaining in the year 2000 is 50 percent for all alternatives (Table 4-8).

Early Successional Stage Species (Early SSS)

This group of species (e.g., long-tailed vole, orange crowned warbler, etc.) utilized all habitats associated with grass-forb and seedling-sapling stage vegetation. Harvest benefits these species for approximately 20 years. Additional habitat would be created for these species along road corridors. Populations could change depending upon the amount of young second-growth.

Short-Term Effects Today (1991) there are 31,939 acres of early successional stage species habitat. The action alternatives schedule between 2 and 7 percent (702 to 2,348 acres) of their habitat (Tables 4-5 and 4-6).

Cumulative Effects Table 4-7 lists the total acres of early successional stage species habitat that would be harvested by the year 2000. The percent of early successional stage species habitat that would be remaining in the year 2000 is ranges from 44 (Alternative 2) to 47 (Alternative 5) (Table 4-8).

Table 4-5 compares the amount of key habitats for each management indicator species that would be harvested under Alternatives 2-5.

Table 4-5

Acres of Harvest in MIS Habitats (*)

MIS Habitat	Current Habitat Acres	Alt. 2 Harvest Acres	Alt. 3 Harvest Acres	Alt. 4 Harvest Acres	Alt. 5 Harvest Acres
Key Winter					
Range (deer)	16,737	370	428	536	910
Intermediate					
Range (deer)	9,066	169	445	463	719
Black bear	1,877	68	55	70	73
Bald eagle	9,090	59	196	272	358
Pine marten	7,929	676	904	1,111	2,298
Cavity nesters	1,402	68	55	70	73
River otter	9,678	86	223	297	385
Early SS Species	31,939	702	955	1,107	2,348

(*) Species habitats overlap - total alternative harvest is equal to early successional stage species.

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Cumulative Effects

Table 4-6 compares the percent of key habitats for each management indicator species that would be harvested under Alternatives 2-5.

Table 4-6

Percent of Harvest in MIS Habitats (*)

MIS Habitat	Current Habitat Acres	Alt. 2 Harvest Percent	Alt. 3 Harvest Percent	Alt. 4 Harvest Percent	Alt. 5 Harvest Percent
Key Winter					
Range (deer)	16,737	2.2	2.6	3.2	5.4
Intermediate					
Range (deer)	9,066	1.9	4.9	5.1	7.9
Black bear	1,877	3.6	2.9	3.7	3.9
Bald eagle	9,090	0.6	2.2	3.0	3.9
Pine marten	7,929	8.5	11.4	14.0	29.0
Cavity nesters	1,402	4.9	3.9	5.0	5.2
River otter	9,678	0.9	2.3	3.1	4.0
Early SS species	31,939	2.2	3.0	3.4	7.4

(*)Species habitats overlap - total alternative harvest is equal to early successional stage species.

Table 4-7 displays by potential indicator species the total acres of original habitat that would be harvested through 2000.

Table 4-7

Total Acres of MIS Habitats Harvested Through 2000

MIS Habitat	Total Harvest Alt. 2 Acres	Total Harvest Alt. 3 Acres	Total Harvest Alt. 4 Acres	Total Harvest Alt. 5 Acres
Key Winter Range				
(deer)	16402	16460	16568	16942
Intermediate Range				
(deer)	7674	7950	7968	8224
Black bear	1351	1338	1353	1356
Bald eagle	2868	29916	3081	3167
Pine marten	24713	24941	25148	26335
Cavity nesters	1331	1318	1333	1336
River otter	3743	3880	3954	4042
Early SS Species	24739	24992	25138	26395

Table 4-8 displays by potential indicator species the percent of original habitat that would be harvested through 2000.

Table 4-8

Total Percent of MIS Habitats Harvested through 2000

MIS Habitat	Total Harvest Alt. 2 Percent	Total Harvest Alt. 3 Percent	Total Harvest Alt. 4 Percent	Total Harvest Alt. 5 Percent
Key Winter Range (deer)	50.1	50.3	50.7	51.8
Intermediate Range (deer)	46.3	48.0	48.1	49.6
Black bear	42.8	42.4	42.8	42.9
Bald eagle	24.0	25.1	25.8	26.5
Pine marten	47.6	48.0	48.4	50.7
Cavity nesters	50.0	49.5	50.1	50.2
River otter	28.1	29.1	29.6	30.3
Early SSS	44.2	44.6	44.9	47.1

As stated in the General Consequences section, evaluation of the effects of timber harvest on wildlife depends upon the extent, location and duration of harvest and individual wildlife species habitat requirements.

The average annual harvest of 4.0 MMBF or approximately 1,000 acres per decade will allow for the needs of wildlife to be considered. Minimum implementation standards would assure that estuarine, beach and streamside habitats are maintained for mink, otter and bald eagle. Dispersal of harvest units within old-growth will provide habitat diversity for deer and bear in many areas. Silvicultural prescriptions for second-growth (canopy gaps, variable spacing) may help mitigate the impact of loss of forage due to canopy closure in stands 35-45 years of age. Eventual canopy closure would result in a decline in the habitat capability for deer and bear. Portions of the study area have had extensive harvest in the past and opportunities to increase habitat diversity and understory development through dispersing units within old-growth or applying post-harvest silvicultural prescriptions are limited. Within these areas, loss of forage production in older second-growth will result in a decline in the habitat capability for deer and bear. By the end of the rotation, opportunities to increase diversity through second entry may exist.

Issue 3 – Effects of Timber Harvest on Visual Quality

The following section describes consequences to the visual resources that are common to all alternatives.

Visual Impacts from the Removal of Old-growth Forest Vegetation

Alternatives 2-5 would result in the harvest of old-growth timber which would be replaced with a heavy growth of young, second-growth trees. When viewed from a road or marine travel route, these second-growth trees are different in size, texture and color than the old-growth that

Anticipated Future Consequences Through the Year 2040

General Consequences

usually surround them for a period of approximately 50 years. Because many of the forested landscapes of southern southeast Alaska are characterized by an unbroken canopy of old-growth trees, the differences between newly harvested areas and old-growth create a contrast that results in a decrease in scenic quality. As the harvest area grows older the contrast gradually declines until, at an age of 50 to 75 years, the difference becomes unnoticeable from a middle-ground or background perspective to most observers.

Landscapes are viewed not only from roads, communities and marine travel routes but also from the perspective of the dispersed recreationists who may be hunting in the woods or fishing along a stream. To some viewers, the scenic qualities associated with the unique values of old-growth forests may be more important than to the person viewing the scene from a distance. Old-growth timber, especially the large, higher volume stands often have exceptionally high scenic qualities for the impressive size and character of the trees and understory vegetation and from the unaltered character of the natural environment. In areas which have been harvested, these values are reduced until, over time, the understory plants are reestablished, the stumps decay and the trees mature. The time required for regrowth to the pre-harvest level of scenic quality is probably about 200 years, although a substantial return is noted after 150 years.

Extended Rotation

The extension of the timber harvest rotation was established in the Tongass Land Management Plan to provide additional latitude in the design of harvest units in visually sensitive areas, and to reduce the effects on visual quality by spreading vegetative alteration over a longer period of time. In the North Sea Otter Sound area, which is classified as LUD IV, the rotation would be extended from 100 years to 120 years. LUD IV areas are those generally allocated to timber harvest or other commodity emphasis rather than amenity values. Extended rotation areas are selected based on an identification of those viewsheds or portions of viewsheds where the slopes, viewing distances or generally character of the terrain require that harvest activities be smaller in scale and more dispersed or space and time to meet a specific Visual Quality Objective (VQO). They are displayed in a pink color on the alternative maps.

In most alternatives a VQO of Partial Retention will be implemented in these extended rotation areas either by the design and location of new units or the avoidance of harvest in these areas due to the extensive past harvest within or adjacent to them. Partial Retention requires that harvest units and other activities be designed and located so as to not dominate the natural landscape. TLMP estimated that 1,971 acres of extended rotation would be required to protect visual resources in the study areas. Table 4-9 shows proposed acres by alternative. Harvest units which fall within extended rotation areas are not included in the totals below. The section below describes by alternative the specific impacts in all the identified key viewsheds identified in Chapter 3, including those identified for extended rotation.

Table 4-9

Acres of Proposed Extended Rotation

Alternative	Acres
1	0
2	3570
3	5306
4	4607
5	2310

Specific Consequences

The following section describes consequences of each alternative including specific impacts to the viewsheds identified in Chapter 3. All the identified viewsheds are marine travel routes or anchorages that are affected to some degree by one of the alternatives.

No new harvest would be visible in the foreground or middleground views from Edna Bay, New Token, the proposed land sale area at Naukati, or from dispersed recreation sites identified during the scoping process.

Alternative 1

No timber harvest would be identified under this alternative. No extended rotation areas would be established.

Alternative 2

The visual resource would receive minor impact under this alternative. All harvest units are primarily composed of windthrown timber and would not be highly visible from marine travel routes, recreation sites and communities. Harvest units would be visible along the road systems of the individual islands. Extended rotation would be established on a total of 3570 acres in the study area.

Small units in the northern section of Marble Pass will result in a partial retention condition in a portion of this area.

There will be no additional visual impacts to the other identified viewsheds.

Alternative 3

The visual resource would receive minor impact under this alternative, primarily from nine A-frame units which would be seen in the foreground view along major and minor marine travel routes. The visual impact of these units could be minimized through proper unit design. Most timber harvest units would be visible only from the road systems on Tuxekan and Kosciusko Islands, or as middleground views from marine travel routes. Extended rotation would be established on a total of 5306 acres in the study area. This amount of extended rotation would be sufficient to provide additional latitude in harvest unit design in all of the most visually sensitive areas.

- **Karheen Pass** – One additional unit will result in a continuation of a modification visual condition in this area.
- **New Token to Brockman Pass** – Two small A-frame units on the east side of Orr Island will, for the most part, be screened from this boat route.
- **Cyrus Cove** – a small A-frame unit near the entrance to the cove will result in a modification visual condition in this area, but will not be visible from inside the anchorage.
- **Marble Pass (North end)** – a few scattered A-frame units throughout this area will result in a partial retention visual condition.
- **Sumner Straits** – a few units just back from the shoreline will result in maintaining a modification visual condition.

This alternative does not further impact the other identified viewsheds.

Alternative 4

The visual resource would receive moderate impact under this alternative. Most timber harvest units would be visible only from the road systems of Tuxekan and Kosciusko Islands, or as middleground views from marine travel routes.

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The primary impact would come from eleven A-frame harvest units which would be in the foreground view along major and minor marine travel routes. The visual impact of these units could be minimized through proper unit design. Extended rotation would be established on a total of 4607 acres in the study area. This amount of extended rotation would be sufficient to provide additional latitude in the design of future units in all of the most visually sensitive areas. Impacts to the identified viewsheds are similar to Alternative 3 except for the following:

- **Tuxekan Pass** – A large A-frame unit on a point of land in Jinhi Bay will result in the visual condition along this part of the pass changing from retention to modification.
- **Marble Pass (North end)** – A-frame units will create slightly greater impacts than Alternative 3, but still result in a partial retention condition.

Alternative 5

The high level of timber harvest included in Alternative 5 would reduce scenic quality along major and minor marine travel routes including Sumner Strait, Warren Channel (Warren Island Wilderness) and Marble, Tuxekan and Karheen Passages. Most notably, two large harvest units on Tuxekan Island would be visible from the tide flats near the Staney Creek Cabin. Extended rotation would be established on a total of 2310 acres in the study area.

- **Tuxekan Passage** – Additional harvest will result in a change in the visual condition of the southern end of this viewshed and the view from the mouth of Staney Creek from partial retention to modification.
- **Karheen Pass** – Long unit will result in maximum modification visual condition.
- **New Tokeen to Brockman Pass** – Long A-frame unit will result in modification visual condition.
- **Marble Pass (North end)** – Greater concentration of A-frame units than other alternatives in this part of waterway will result in modification visual condition.
- **Sumner Strait** – Additional units back from shore will maintain modification visual condition. Along Warren Channel just to south a couple of units will result in modification visual condition.

There will be no additional impacts in Cyrus Cove and in Tenass and Brockman Passes.

Cumulative Effects

The past intensive timber harvest in Sea Otter Sound will continue to become less visually apparent in the future as the second-growth timber develops. The varying levels and locations of future timber harvest presented in the alternatives will determine whether there is a net increase or decrease in the scenic qualities of the Sound.

Under Alternatives 2 and 3, there would be a net increase in scenic quality as past harvest in sensitive areas becomes less apparent and new units are located where they would have minor visual impact.

Under Alternative 4, the scenic quality would maintain its current reduced level as past harvest in sensitive areas becomes less apparent through regrowth and new harvest units are located where they will create new visual impacts.

Under Alternative 5, the current level of scenic quality would be reduced further as concentrated harvest in visually sensitive areas outpaces regrowth in previously harvested areas, and as new, fairly extensive harvest is initiated in areas now in a natural condition.

**Anticipated Future
Consequences
Through the Year
2040**

Assuming that a harvest level of 40 MMBF (approximately 1,000 acres) per decade is carried out through the year 2040, timber harvest during this period would remove approximately one-fifth of the remaining old-growth timber from the identified viewsheds. This amount of harvest could be expected to approximately maintain the level of visual quality found in the study area in 1987 and to meet the VQO of Modification, assuming harvest units would be designed to minimize visual impacts. This means that harvest units will generally dominate the natural character of most viewsheds, but that their design will enable them to blend into the natural terrain or vegetative features of the area.

Issue 4 – Maintenance of Existing Lifestyles

Loggers, fishermen and other residents in North Sea Otter Sound place a high value on maintaining their isolation, solitude, recreation and wilderness opportunities. Despite this shared interest, there is considerable difference of opinion regarding the social as well as biological impacts associated with timber harvest. For some, harvesting timber is perceived to negatively affect lifestyles. For others, harvesting timber is a lifestyle.

Social well-being is largely influenced by actual or perceived changes in people, jobs, resources and facilities, health and public safety. If extensive, these changes can result in widespread effects on lifestyles. To determine how a community will react to and be impacted by these changes, general and specific lifestyle consequences are outlined below.

**General
Consequences**

People

Changes in the number of people living in a community can affect all aspects of community organization. This is particularly true if newcomers differ from the existing population in occupational characteristics and attitudes toward development. These differences can result in varying degrees of conflict of interest.

Jobs

Lifestyles, economic opportunities and community perceptions can be strongly influenced by the number and type of jobs available in an area. Elimination or creation of jobs in one sector (logging or fishing) can result in change of opportunity or lifestyles for the other sector of the population. Some residents of Edna Bay indicated controlled use of the log transfer facility (LTF) might be acceptable with written assurance that no timber from the 1989-94 KPC Long-Term Sale operating period would be transported through the bay. Even so, local residents largely oppose reactivation of the LTF. By not operating the LTF, job opportunities for loggers and part-time loggers may be lost. However, conflicts between individuals and groups having different attitudes about development may also be reduced.

Resources and Facilities

Direct or indirect changes in the cost or availability of private, local, state or public resources or facilities can affect lifestyles. Proposed actions including timber harvest, road construction and LTFs, can result in direct changes to the public resource. These activities are perceived by some as employment opportunities and by others as a threat to their solitude and sense of isolation.

An indirect impact that may result from project implementation involves population changes. For example, if facilities and services are inadequate to accommodate the needs of newcomers, social impacts may result. The only facilities and services available in the Sound include a general store at Tokeen, and a post office and school at Edna Bay. Any increase in population would likely bring additional business to the store but would not likely impact the post office as

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mail is typically flown in and out of each settlement. If a logging camp is reestablished in Cape Pole, there is potential for impact on Edna Bay school. If families with school-aged children move to Cape Pole or Edna Bay and do not study by correspondence, and a school is not established, they will likely attend school at Edna Bay. Depending on numbers, this facility may not be adequate to meet the demand. With increased contact between individuals in favor of and opposed to development, the potential for conflict is likewise increased.

Scheduled or unscheduled increases in timber available for harvest can result in a population increase. For example, should catastrophic windthrow occur, additional loggers may be drawn to the area. The proposed land sale at Naukati could also result in population increases and is likely to draw individuals opposed to development.

Health and Safety

Two situations exist in which health and safety may be perceived to be affected by proposed activities. These include location of harvest units and LTFs. If units are not properly located, protected anchorages can be exposed and become unacceptable for safe harbor. As indicated earlier in this document, all identified anchorages would be protected by properly locating timber harvest units.

Edna Bay residents indicate that for health and safety reasons as well as aesthetic reasons, they prefer the LTF in the bay not be reactivated. They feel the LTF would jeopardize safe boat traffic, anchorages and water quality in the bay.

Specific Consequences

Alternative 1

Implementation of Alternative 1 precludes timber harvest. Without planned or scheduled timber harvest, a stable timber base would not be established or maintained. Given this unpredictable economy, opportunities or lifestyles of loggers in the area could change. That is, some may have to move elsewhere to find jobs. Loggers may perceive those opposed to timber harvest as responsible for lack of work, thereby increasing conflict between user groups. There will be no impact on available services and facilities or organizations in the area as the population is not expected to increase from logging activity. It is not expected that impacts to isolation and solitude would be negative. Not to be overlooked, however, is the possibility of catastrophic windthrow.

Should catastrophic windthrow occur, additional loggers could be drawn to the area. It is likely a logging camp and LTF would be established at Cape Pole and, if warranted, the LTF at Edna Bay would be reactivated. This could result in an increased potential for conflict between user groups, an impact on the Edna Bay school and negative perceptions of Edna Bay residents on their isolation and solitude.

Alternative 2

Alternative 2 schedules 28.2 MMBF of salvage for harvest and construction of 4.5 miles of road. Timber would be hauled to Nichin Cove, Cape Pole and/or Edna Bay LTFs, depending on the most economical route. This alternative differs from Alternative 1 in that existing salvage units and roads necessary to access the timber are identified. Development is planned and scheduled. This is expected to reduce the uncertainty for continuation of logging jobs associated with Alternative 1. However, the amount of timber scheduled is insufficient to support all loggers currently in the area. There will be no negative impacts on available services or facilities.

If the LTF at Edna Bay is reactivated, the isolation and sense of solitude of community residents will be disturbed. This could result in increased conflicts between residents and loggers.

Alternative 3

Implementation of Alternative 3 schedules 37.2 MMBF of salvage and commercial timber for harvest. A total of 5.0 miles of road is scheduled for construction. Timber would be transported to the LTFs at Cape Pole and Nichin Cove and the Edna Bay LTF would not be reactivated. As with Alternative 2, this alternative is expected to reduce the uncertainty for continuation of logging jobs.

Unlike Alternative 2, the amount of timber scheduled in this alternative would support and maintain the present level of demand for logging jobs. However, these harvest levels are not expected to draw additional loggers into the area. Consequently, there would be no negative impacts on available services and facilities nor would conflicts between user groups be stimulated. Even with reestablishment of a logging camp at Cape Pole, the amount of harvest scheduled is not sufficient to draw so many loggers and their families that Edna Bay school would be impacted.

Alternative 4

Alternative 4 schedules 46.2 MMBF of salvage and commercial timber for harvest and 6.7 miles of road would be built. Timber would be transported to the Nichin Cove or Cape Pole, depending on which is most economical. As with Alternative 3, introduction of new people to the area is not likely to be substantial since the proposed timber harvest is sufficient only to support and maintain present levels of demand. Excessive demands on facilities and services are not expected, as few newcomers would move into the area.

Alternative 5

Implementation of Alternative 5 schedules 98.3 MMBF of salvage and commercial timber for harvest. A total of 18.0 miles of road is scheduled for construction. Timber would be transported to the Nichin Cove, West Orr, Cape Pole or Edna Bay LTF depending on which is most economical. With this four-fold increase over Alternative 2 of timber available for harvest, the number of logging/thinning and associated jobs would likewise increase. This could bring about an increase in the logging population in the area which could result in additional conflict between those favoring development and those opposed. This would particularly be so with reestablishment of a logging camp in Cape Pole and LTF in Edna Bay. Should a camp be placed in Cape Pole, school-aged children would participate in correspondence or attend Edna Bay school. If large in number, this facility may not be adequate to meet additional demands. Reactivation of the Edna Bay LTF would likely disturb the isolation and sense of solitude of community residents.

Issue 5 – Protection of Subsistence Use Areas

Many residents of North Sea Otter Sound depend on natural resources for subsistence purposes to supplement limited seasonal incomes and provide needed food. Hunting, fishing, trapping and gathering are important for community livelihood. The Alaska National Interest Lands Conservation Act (ANILCA) was passed in 1980. Consistent with sound management principles and the conservation of healthy populations of fish and wildlife, Congress declared through enactment of Title VIII of ANILCA that the utilization of public lands in Alaska cause the least adverse impact possible on rural residents who depend upon subsistence uses of the resources on such lands. ANILCA mandates federal agencies to evaluate potential impacts of proposed activities on subsistence resources and, when possible, to mitigate negative effects.

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According to ANILCA, actions which disturb subsistence populations, habitat, and/or access may have an impact on subsistence activities.

Actions proposed in this document that could result in impacts to subsistence activities include timber harvest, roading, establishment of logging camps and LTFs. The general consequences of these actions are outlined below. Also presented in this section are consequences specific to each alternative and, as required by ANILCA, an evaluation of the significance of these consequences.

General Consequences

Timber harvest

Timber harvest has the potential to impact both stream and upland habitats critical to important subsistence species including salmon, deer, bear, and furbearers, specifically marten. Impacts would generally be short-term and, depending on scheduling and location of harvest, could create diversity in the remaining old-growth which could improve habitats for some second-growth dependent species.

Roading

Roads give subsistence users access to otherwise inaccessible areas, thus increasing their opportunities to participate in subsistence activities. However, roads can result in increased competition for wild resources from non-rural residents. This could result in a decline of local subsistence species and subsequent restrictive regulations. Even so, subsistence users of the resource would have priority use. Given the relative isolation of the area, this is an unlikely occurrence.

Logging camps

The establishment of logging camps near other subsistence communities can result in increased competition for subsistence resources.

Log transfer facilities (LTFs)

Most of the impacts to marine habitats from logging are associated with LTFs. The sloughing of bark from logs dumped into marine waters can result in the reduction of habitat critical for important subsistence species including crab. The physical disturbances associated with noise, equipment, people, etc. can modify the use of the surrounding habitat by deer, bear, furbearers and waterfowl make. Clearly, bays with high wildlife use can be expected to have greater potential for impact than a bay with lower use. There are no new LTF sites proposed for construction with this EIS. The LTFs at Nichin Cove, West Orr Island, Cape Pole or East Edna Bay may be reactivated. Of these, only Edna Bay is used for subsistence clamming and crabbing.

Specific Consequences

An evaluation of the impacts of timber harvest, roading, logging camps and LTFs on subsistence is presented for each alternative.

Alternative 1

Implementation of Alternative 1 precludes timber harvest. There are no roads planned for construction with this alternative nor is a logging camp to be established in the area. As no roads or logging camps are scheduled to be established in the area, competition from increased access and people would not occur. Cape Pole was not identified as an area used for subsistence clamming or crabbing; consequently, reactivation of the LTF will not impact these subsistence activities.

Section 810(a) Finding for Alternative 1 – This evaluation concludes that this alternative shall not result in a significant restriction of subsistence uses.

Alternative 2

Alternative 2 schedules 28.2 MMBF of salvage for harvest and construction of 4.5 miles of road. Large logging camps will not be established in the area. Timber would be hauled to the most logical LTF including Nichin Cove, Cape Pole and Edna Bay. Of approximately 15,588 acres used for subsistence, 76 acres are scheduled for harvest with this alternative. This would not result in a significant reduction of access to the area by people or animals. Of the 4.5 miles of road to be constructed, 0.6 miles fall within subsistence areas. Increasing road access by 0.6 miles would not result in competition for subsistence resources from non-rural residents. Competition from increased numbers of people would not occur as no large logging camps would be established.

Section 810(a) Finding for Alternative 2 – This evaluation concludes that this alternative shall not result in a significant restriction of subsistence uses.

Alternative 3

Implementation of Alternative 3 schedules 37.2 MMBF of salvage and commercial timber for harvest. A total of 5.0 miles of road is scheduled for construction. Timber would be hauled to the LTF at Cape Pole via the Edna Bay road and Nichin Cove. The Edna Bay LTF would not be reactivated. Of approximately 15,588 acres used for subsistence, 103 acres are scheduled for harvest with this alternative. This would not result in a significant reduction of access to the area by people or animals. Of the 5.0 miles of road scheduled for construction, 0.2 fall within subsistence areas. Increasing road access by 0.2 miles would not result in competition for subsistence resources from non-rural residents. Competition from increased numbers of people would not occur as no large logging camps will be established.

Section 810(a) Finding for Alternative 3 – This evaluation concludes that this alternative shall not result in a significant restriction of subsistence uses.

Alternative 4

Alternative 4 schedules 46.2 MMBF of salvage and commercial timber for harvest and 6.7 miles of road would be built. Timber would be hauled to the most logical LTF at Nichin Cove or Cape Pole. Of approximately 15,588 acres used for subsistence, 143 acres are scheduled for harvest with this alternative. This would not result in a significant reduction of access to the area by people or animals. Of the 6.7 miles of road scheduled for construction, 0.6 miles fall within subsistence areas. Increasing road access by 0.6 miles would not result in competition for subsistence resources from non-rural residents. Competition from increased numbers of people would not occur as no large logging camps would be established.

Section 810(a) Finding for Alternative 4 – This evaluation concludes that this alternative shall not result in a significant restriction of subsistence uses.

Alternative 5

Implementation of Alternative 5 schedules 98.3 MMBF of salvage and commercial timber for harvest. A total of 18.0 miles of road is scheduled for construction. Timber would be hauled to the most logical LTF at Nichin Cove, West Orr, Cape Pole or Edna Bay. Of approximately 15,588 acres used for subsistence, 152 acres are scheduled for harvest with this alternative. Of the 18.0 miles of road scheduled for construction, 1.7 miles fall within subsistence areas. Increasing road access by 0.6 miles would not result in competition for subsistence resources from non-rural residents. Competition from increased numbers of people could occur as large logging camps may be established.

Section 810(a) Finding for Alternative 5 – Of all alternatives, Alternative 5 would have the greatest impact on subsistence.

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However, when viewed in light of the total subsistence lands and resources available to, and identified by, Sea Otter Sound residents, this evaluation concludes that this alternative would not likely result in a significant restriction of subsistence uses.

All alternatives have been evaluated in this section for their effect on subsistence uses and needs. A summary highlighting major differences between the alternatives is presented in Table 4-10.

Table 4-10

Comparison of Timber Harvest Acreage and Rooding Mileage

Alternative	Acres Scheduled for Harvest	Miles of Road Scheduled for Construction	Large Logging Camps Established
1	0	0.0	No
2	76	0.6	No
3	103	0.2	No
4	143	0.6	No
5	152	1.7	Possibly

Cumulative Effects

In compliance with ANILCA, subsistence hearings were held at rural communities which were identified as utilizing the project area for subsistence areas.

Issue 6 – Timber Sale Economics

The current Forest Plan (TLMP) designates all of the VCUs within the NSOS area as LUD IV with management emphasis on commodity use of resources. TLMP gives management direction to Management Area K05, VCUs 543, 544, 545, and 546, for second-growth management and timber harvest of old-growth while protecting subsistence and fisheries values. Special emphasis is to be placed on subsistence. TLMP management emphasis for VCUs 556, 557, 560 and 587 is on taking advantage of highly productive timber growing sites while protecting key recreation, fish and wildlife values. TLMP management emphasis for VCU 555 is to continue timber harvest at moderate levels while protecting subsistence values.

Specific Consequences

Commercial Forest Land

Alternatives 2 through 5 propose to cut from 2.2 to 7.4 percent of the available commercial forest land in old growth during the next ten years (Table 4-11). The planned timber harvest in each of the alternatives will occur predominantly in volume class 6 and 7. These volume classes have the greatest timber value and the highest return. They are also more prone to windthrow and salvage considerations than the lower volume classes.

Local Logging Operator Needs

Alternative 1 will have no planned or scheduled timber harvest to perpetuate a stable timber base for the economy.

Alternative 2 (28.2 MMBF) will not meet the anticipated needs of the local logging operators. Alternative 3 (37.2 MMBF), Alternative 4 (46.2 MMBF) and Alternative 5 (98.3 MMBF) will all meet the anticipated volume needs of the local operators for this area.

Table 4-11

Acres of CFL Proposed for Harvest by Volume Class

Alt.	Acres Volume Class 4	Acres Volume Class 5	Acres Volume Class 6	Acres Volume Class 7	Acres Totals	Total CFL	Commercial Forest Land in Old Growth
Exist	4,010	10,609	10,170	7,150	31,939	55,976	31,939
1	0	0	0	0	0	55,976	31,939
2	0	138	310	254	702	55,976	31,939
3	38	179	475	263	955	55,976	31,939
4	12	202	436	442	1,116	55,976	31,939
5	47	327	948	1,026	2,348	55,976	31,939

Salvage of Windthrow

In order to meet the objectives of resources other than timber, and provide harvest opportunities which are economical, Alternatives 2, 3, 4 and 5 plan to leave areas of windthrow unharvested (Table 4-12).

Table 4-12

Acres of windthrow not salvaged

Alternative	Windthrow Unharvested
2	85
3	120
4	100
5	85

Isolation of Timber

In order to meet the objectives of resources other than timber, partial settings were designated which may isolate timber from future harvest. Table 4-13 gives the acreage and timber volume that may be isolated due to the harvest of partial settings.

Table 4-13

Acreage and Volume Isolated by Harvest of Partial Settings

Alternative	Acres Isolated	Timber Volume (MMBF) Isolated
1	0	0
2	61	2.64
3	83	3.61
4	84	3.56
5	0	0

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Economic Analysis

An economic analysis of the timber harvest was performed to determine the relative economic viability of the alternatives. Timber volume identified under each alternative was analyzed for economic costs and values attributed to timber harvest from the stump to placement in the water at the LTF under mid-market conditions.

The middle market is defined as the value and product mix represented at the quarter in which the pond log value (end-product selling price less manufacturing cost) for the species and product mix most closely matches the point between the ranked quarters of the Alaska Index Operation pond log value, adjusted to Common Year Dollars, where one half of the harvest of timber from the Tongass National Forest has been removed at higher values, and one half of the timber has been removed at lower values, during the period from 1979 to the current quarter.

Only the short term direct costs and values to the operator associated with timber harvest were used. The timber values reflected in this analysis do not represent gross or net returns to the government. Roads were considered as a cost attributed only to timber harvest in each alternative. The long-term benefits of road construction were not considered. The costs and benefits to activities other than timber harvest were also not included.

The timber value in \$/MBF for the volume in each alternative was developed based on species composition and grade from previous sales and inventories in the area using middle market pond log selling values adjusted to current dollars.

The harvest costs developed for the analysis were based on (middle market) Alaska Region appraisal data amendment # 87, ID #62 for each logging system and volume class. Log transfer site reconstruction and road construction and reconstruction costs were developed based upon historical cost averages from costs incurred under similar conditions to those in the Sea Otter Sound area.

Table 4-14 shows a comparison of the cost and value of timber at middle market levels for each alternative. The values shown in this chart should be used only for relative ranking between alternatives. They should not be used for absolute values for separate alternatives due to the uncertainty of projecting valid timber market levels. Stumpage values may vary according to market conditions, as well as logging and manufacturing costs at the time of sale. The differences in values and costs in the comparison of alternatives exist due to differing volume class distributions, logging systems, and transportation systems constructed and used in the different alternatives. The analysis covers only the short term direct costs and values associated with the timber harvest identified in each alternative.

Table 4-14

Financial Analysis Summary

<i>Components</i>	<i>Alternatives</i>				
	1	2	3	4	5
Sawlog (MMBF) Mid Market	0	28.2	37.2	46.2	98.3
Pond Log Value (MM\$)	0	7.6	10.3	12.4	27.2
Stump to Truck Logging Costs (MM\$)	0	2.7	3.7	4.5	9.2
Road Construction Costs, LTSs (MM\$)	0	1.0	1.0	1.2	3.7)
Haul, Dump, Raft & Tow Costs (MM\$)	0	0.9	1.2	1.5	3.3
Mid-Market Conversion (MM\$)	0	3.0	4.4	5.3	11.0
Mid-Market Conversion Rate (\$MBF)	0	106.38	118.28	113.98	111.90

Cumulative Effects

This section addresses the cumulative effects of past harvest and proposed harvest in the study area.

Timber Productivity

Total fiber production for timber increases proportional to the acres of old-growth converted to second-growth stands.

The Timber Sale Program Information Reporting System (TSPIRS) contains tables for projecting potential volumes on new stands under managed conditions. Projected volumes for various sites and treatments have been calculated and are available in the planning records.

Table 4-15 compares the productivity potential for the next 100-year rotation. Assumptions include no precommercial thinning on volume class 4 stands; precommercial thinning of all volume class 5 and 6 stands; and precommercial and commercial thinning on all volume class 7 stands.

Table 4-15

Productivity Potential of Proposed Harvest Acres by Volume Class

	Volume Class 4	Volume Class 5	Volume Class 6	Volume Class 7	Totals
Alternative 1					
Acres Harvested	0	0	0	0	0
Potential Volume MMBF	0	0	0	0	0
Alternative 2					
Acres Harvested	0	138	310	254	702
Potential Volume MMBF	0	6,762	15,190	14,681	36,633
Alternative 3					
Acres Harvested	38	179	475	263	955
Potential Volume MMBF	1,376	8,771	23,275	15,201	48,623
Alternative 4					
Acres Harvested	12	202	436	454	1,116
Potential Volume MMBF	434	9898	21,364	26,241	57,937
Alternative 5					
Acres Harvested	47	327	948	1,026	2,348
Potential Volume MMBF	1,701	16,023	46,452	58,687	122,863

Clearcutting has been used almost exclusively as the silvicultural harvest system in southeast Alaska. Approximately 32 percent of the total land base and 43 percent of the Commercial Forest Land (CFL) in the study area has been harvested in the last forty-seven years by this system. As a result, uneven-aged old-growth stands have been converted into even-aged second-growth stands.

Second-growth stands can be silviculturally managed to simulate old-growth wood quality and possibly several old-growth forest characteristics. However, economic infeasibility based upon historic market conditions and current technology may preclude duplication of these characteristics in most second-growth stands.

The Tongass Land Management Plan calls for rotations of between 100 and 120 years in the study area, depending on management objectives, investments and site quality. Mortality due to overmaturity would be virtually eliminated in the fast growing second-growth stands.

Species composition in second-growth will also vary from the old growth stands. Harvesting will generally increase the spruce component of a stand by opening the stand up to light

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interception and thus promoting spruce regeneration. Local studies have shown that after precommercial thinning favoring spruce retention, the spruce component may be increased by 20 percent over unthinned stands.

Second-growth stands will exhibit less variation in tree diameter and height than the old-growth they replace. For unmanaged second-growth at 100 years average diameters are estimated to range from 10.5 inches on the poorer sites to 17.2 inches on the best sites (Taylor 1934). With more intensive management, i.e., precommercial thinning and commercial thinning, it is possible to produce average stand diameters which approximate old-growth averages. Local projections on the better sites estimate diameters would be 25 to 36+ inches in 100 to 120 year rotations.

In terms of today's markets, these stands would also have fewer tight grained logs than those in the old-growth stands. Future values of second-growth ca not be accurately predicted at the present time. Markets in southeast Alaska are undeveloped and untested, wood products technology is still developing and future needs are unknown. However, total cubic volume yields of useable wood per acre would be significantly greater in second-growth stands.

Volume Projections

Predicting timber volumes produced by a new stand during a 100-year rotation is complex and contains a degree of uncertainty. Many assumptions have to be made. The results are estimates and may vary for many reasons, such as available funding for intermediate treatments, technological changes in logging techniques and product development, market conditions, accuracy of biological predictions and changes in management direction.

Conversion of old-growth stands to highly productive second-growth stands (in terms of wood fiber) would result in greater net growth. The project area contains a variety of age classes in second growth as well as unharvested uneven-aged stands. The TSPIRS growth and yield model was used to determine volumes. Projections show the board foot production for all stands harvested over a 100-year rotation. Several silvicultural treatment scenarios were assumed in the calculations. The assumption is made that no thinning would occur in Volume Class 4 stands, precommercial thinning would occur in all Volume Class 5 and 6 stands, and precommercial and commercial thinning would occur in Volume Class 7 stands. Table 4-16 displays the cumulative potential volume production of second-growth stands.

Table 4-16

Cumulative Potential Volume Production in Second-growth

Alternative	Acres of Second Growth in 1987	Cumulative Acres of Second Growth thru 2000	Potential Vol. of Stands Harvested Before 1987. No Thinning (MBF)	Potential Volume Produced MBF from Table 4-12	Total Cumulative Potential Volume (MBF)
1	24,037	24,037	927,823	0	927,823
2	24,037	24,739	927,823	36,633	964,456
3	24,037	24,992	927,823	48,623	976,446
4	24,037	25,153	927,823	57,937	986,348
5	24,037	26,395	927,823	122,863	1,050,686

Windthrow

Timber windthrow can be expected to continue, as it has historically in the study area, due to natural conditions and where standing timber is exposed to new openings. Salvage of this windthrow would continue to be emphasized but not all of the windthrow can or would be salvaged due to cost considerations and the objectives of other resources. The use of windfirm harvest boundaries such as lakes, muskegs or second-growth will help minimize potential future windthrow wherever possible.

Roads

The proposed road construction associated with timber harvest in each of the alternatives would bring the total road mileage to between 233 and 246 miles.

The existing roads have taken approximately 554 acres out of long-term resource production, assuming an average road surface of twenty feet. The proposed road construction in the alternatives would take an additional 11 to 44 acres out of resource production (Table 4-17).

Table 4-17

Cumulative Road Construction by Alternative

Alternative	Current Road Mileage	Cumulative Road Mileage	Current Road Acreage	Cumulative Road Acreage
1	228.4	228.4	554	554
2	228.4	232.9	554	565
3	228.4	233.4	554	566
4	228.4	235.1	554	570
5	228.4	246.4	554	597

Allowable Sale Quantity

The cumulative effects of the ASQ on the North Sea Otter Sound area are developed from the TLMP ASQ established in 1979. From 1979 through 1987 harvest totaling 129.9 MMBF occurred on the area. This exceeded an ASQ of 102.6 MMBF. The plan proposes harvest levels in Alternatives 2 through 5 which would fall below the ASQ. When all the harvest from both time periods is combined for the years 1979-2000, total output falls below the average annual ASQ in Alternatives 1, 2, 3 and 4, and exceeds the average ASQ in Alternative 5.

Table 4-18

Allowable Sale Quantity and Harvest Levels by Alternative

Alternative	TLMP ASQ 1979-1987 MMBF	Past Harv. 1979-1987 MMBF	TLMP ASQ 1991-2000 MMBF	Proposed Harvest 1991-2000 MMBF	Cumulative TLMP ASQ 1979-2000 MMBF	Cumulative Harvest 1979-2000 MMBF
1	102.6	129.9	114	0	216.6	129.9
2	102.6	129.9	114	27.6	216.6	158.1
3	102.6	129.9	114	36.6	216.6	167.1
4	102.6	129.9	114	46.5	216.6	180.3
5	102.6	129.9	114	98.3	216.6	228.2

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Anticipated Future Effects through the Year 2040

Over the long run (end of Plan to year 2040), harvest level is expected to be approximately 40 MMBF per decade. Approximately one-half of the planned harvested acres will be precommercially thinned and one-quarter of the planned harvest acres will be commercially thinned. Accordingly, 31 percent or 17,255 acres of the total CFL will be intensively managed, 22 percent or 12,082 acres will be relatively unmanaged (unthinned) and 48 percent or 26,868 acres will be in old-growth at the year 2040. The year 2040 would see completion of the first 100-year rotation of timber harvest since the first logging occurred on the area in the 1940s. Harvest of 40 MMBF per decade would be below the ASQ of 114 MMBF per decade.

Table 4-19

Expected Harvest through Year 2040

	Acres	Volume MBF
Past Harvest	24,037	961,480
Total Old-growth CFL		
Remaining in 1987	55,976	1,085,665
Harvest 1988-204	5,300	212,000

Table 4-20

Acres of intensive management through year 2040

	Up to 1987	1991 to 2000	2001 to 2040
Acres of Precommercial Thinning	7,255	2,700	2,000
Acres of Commercial Thinning	0	2,300	3,000
	<u>7,255</u>	<u>5,000</u>	<u>5,000</u>
Total : 17,255			

Issue 7 – Location and Use of Transportation Systems and LTFs

General Consequences

The existing transportation system is extensive, especially on Kosciusko and Tuxekan islands. To access proposed timber units, new roads will need to be constructed, and sections of existing roads will need to be reconstructed to be in suitable condition for timber haul. Several bridges will need replacement, either because they have deteriorated or because they have been removed to be used elsewhere.

None of the inactive LTFs within the project area are suitable for use in their current condition. Some form of reconstruction will be necessary.

Specific Consequences

Construction

The proposed roads are those new roads needed for harvest of timber volume associated with each respective alternative.

Reconstruction

Numerous roads in the area will need reconstruction prior to haul of timber. Reconstruction includes brushing, blading and shaping road bed, pulling ditches, rock filling low areas and waterbars, and installing culverts.

Bridges and Culverts

Because of the vintage of many of the roads in the project area, numerous culverts will need to be installed where earlier native log structures have been removed. Many existing native log bridges on the main roads of Kosciusko Island were replaced with metal culverts in 1989 to accomodate public and forest uses. The bridge over Trout Creek was not replaced as this crossing will require replacement with a bridge rather than a culvert.

The Trout Creek bridge was built of native log timber in 1975. These structures generally have a safe working life of 10 to 12 years. Prior to hauling of timber, this bridge will require inspection to determine its safe working load carrying capacity. Weight restrictions or bridge replacement may be applied depending upon the condition of the bridge.

A modular bridge will need to be reinstalled on Tuxekan Island to access a salvage harvest unit. The abutments were left in place when the bridge was originally removed. Thus only transporting and lifting the bridge in to place is required.

An existing road will require installation of a major culvert to provide a crossing where an original native log structure was removed. Major culverts are those with over 35 square feet of end area. This translates to those of 80 inch diameter and greater.

Log Transfer Facilities

The project area contains numerous log transfer facilities. No new LTF sites are planned in this project, provided planned modifications of the existing LTFs are acceptable from a marine environmental standpoint. If the Nichen Cove facility cannot be modified the West Tuxekan site will need to be reactivated. Table 4-24 portrays the number of LTF facilities required by alternative.

All of the LTF sites need reconstruction or modification prior to use. The existing sites will accomodate use of A-Frame transfer systems. Such systems are excellent for large operations, but are most uneconomical for the small operator. This plan proposes selling very small timber sales for small operations. Accordingly, the Cape pole, Edna Bay and Nichen Cove facilities will need to be modified to accomodate the small operations. Modifications will include construction of low gradient slides adjacent to the existing facilities. The West Orr steep slide may require some modifications to accommodate low gradient slide capabilities. Additionally, part of the Cape Pole LTF is privately owned. Thus the facility will require modification to avoid the private land.

The Alaska Department Of Natural Resources' *Prince Of Wales Island Plan*, Dec 1988, calls for abandonment of the West Orr Island LTF after this decade. The *Prince of Wales Island Plan* provides a possible LTF site on the south end of Orr Island for long term use if significant timber operations are ever re-established in the future. The proposed harvest in Alternative 5 could not support the extensive road needed to reach the south end of Orr Island. Reactivation of the West Orr LTF for this project is consistant with that plan.

Only three methods were considered in detail. These are Barging, A-Frame Lift Off and Low Gradient Slide systems.

- **Barging**

Small timber offerings are generally uneconomical for large barging operations. However, small operators with small shallow draft barges can use existing A-Frame bulkheads to load logs. This generally requires that log loading be done during mid to high tides to avoid grounding of the barge. Such barges carry very small loads and require many trips. These operations are highly marginal and tow distances would need to be relatively short. Availability of such operations is very limited. Such operations generally consist of operators with a barge of up to 60 feet long and a 30 to 50 foot tow boat.

Barging would require a large upland area to store logs between loading and tow operations that would be governed by tow distances and tides. This method eliminates the need for rafting areas.

- **A-Frame with Rafting**

The A-frame transfer method generally consists of a shot rock pad, two drum yarder or crane hoist engine with a fixed mast and falling boom arrangement to lift log bundles from truck to water. A-frame systems are most often used for handling timber volumes of 10MMBF and up.

The pad is generally 120 to 150 feet wide and 120 to 150 feet long on the bulkhead side. The bulkhead is 60 to 80 feet long and 15 to 20 feet high. The Shot rock pad requires about 5,000 to 9,000 cubic yards of rock fill. These facilities generally cost \$17,000 to \$300,000 to construct and equip, depending upon site conditions, construction materials and equipment used.

A-frames sites generally take advantage of steeper sloped beaches and moderately sloped uplands to balance the excavation and embankment materials. Approximately 0.3 acres of intertidal and subtidal marine habitat is covered with rock.

Rafting areas required for large volume operations tend to be 20 to 30 acres for raft building and storage. Operations handling 50 to 60 MMBF per year require much larger rafting areas.

- **Low Gradient Slide**

This design would include a steel or wood rail slide on a shotrock ramp of 17 percent or less gradient that would allow the log bundles to slowly slide unassisted into the water while keeping the speed of entry into the water at a minimum. During dry conditions log bundles would have to be pushed down the slide. The slide would be designed to facilitate removal of the bark debris that accumulates at the upper end of the slide.

When the low gradient slide is designed for large operations, approximately 20,000 cubic yards of rock fill and a 20 acre sort yard would be needed. For small operations a smaller fill of about 3,000 to 5,000 cubic yards with a 2 to 3 acre upland off loading area is needed. The large output system would cover about 0.7 acres of intertidal marine habitat area; whereas, the small ramp fill would cover about 0.3 acres.

Typically, the high output system would cost \$200,000 to \$300,000 to construct. Small production systems range between \$60,000 to \$200,000. Weather exposure conditions of the site can add a significant cost to this system as the system is susceptible to heavy wave action that often requires special surface treatments and structural armor to withstand adverse conditions.

Large operations would require approximately 15 to 20 acres for raft and booming. The small operation would generally need 2 to 10 acres depending upon the size of the sale and timber output rate of the small operator.

Table 4-21

Transportation Development and Costs by Alternative

	<i>Alternatives</i>				
	1	2	3	4	5
New construction					
Miles	0.0	4.5	5.0	7.0	18.0
MM\$	0.00	0.59	0.65	0.87	2.34
Reconstruction					
Miles	0.0	3.9	6.8	6.8	7.5
MM\$	0.0	0.05	0.08	0.08	1.00
Bridges & Major Culverts					
Bridges MM\$	0.00	0.06	0.06	0.14	0.06
Major Culverts MM\$	0.00	0.00	0.00	0.00	0.02
Total	0.00	0.06	0.06	0.14	0.08
LTF Modification MM\$					
Cape Pole	0.00	0.11	0.11	0.11	0.11
Edna Bay	0.00	0.10	0.00	0.00	0.10
Nichen Cove	0.00	0.06	0.06	0.06	0.06
West Orr	0.00	0.00	0.00	0.00	0.02
Total	10.00	0.27	0.17	0.17	0.29
Total Cost MM\$	0.00	0.97	0.96	1.26	3.71

MM\$ = millions of dollars

Truck loads are estimated to be 5000 bed foot per load.

Timber Haul Routes

Timber haul is scheduled to be hauled to varying log transfer facilities depending upon which alternative is implemented. Table 4-22 portrays the amount of volume that would either go into or pass through Edna Bay.

Table 4-22

Haul Into or Through Edna Bay

Alternative	Timber Volume (MBF)	Truck Loads (ea)	LTF Destination
1	0	0	None
2	5,060	1,012	Edna Bay
3	1,250	250	Cape Pole
4	1,250	250	Cape Pole
5	28,221	5,644	Edna Bay

Truck loads are estimated to be 5,000 bed foot per load.

4 Environmental Consequences

Cumulative Effects

Marine Benthic Habitat

Log transfer facilities impact the marine benthic habitat (plants and animals that live in and on the bottom). See detailed discussions in the 1989-94 KPC Long-term Sale FEIS. The modifications of the LTF sites will create additional impacts, however the bark deposition will be in the same areas as the original A-Frame sites caused, because the same rafting sites will be used and the low gradient slides will be directly adjacent to the already impacted sites. Additional impacts will be generated as a result of additional structural embankment needed to construct the low gradient slides adjacent to the existing facilities. The Marine Benthic impacts are expected to be as follows:

1. Structural Embankment: Estimated 0.23 acres/site.
2. Site Bark Deposition: Estimated 1.96 acres/site
3. Raft Storage Bark Deposition: Unknown

Table 4-23

Marine Benthic Habitat Affected

	<i>Alternative</i>				
	1	2	3	4	5
Number of Sites	4	4	4	4	4
Current Acres Affected by Structural Embankment	0.9	0.9	0.9	0.9	0.9
Additional Acres Affected by Structural Embankment	0.0	0.7	0.5	0.5	0.9
Total Acres Affected by Structural Embankment	0.9	1.6	1.4	1.4	1.8
Estimated Acres Affected by Bark	7.8	7.8	7.8	7.8	7.8

Table 4-24 summarizes the LTFs involved in the various alternatives.

Table 4-24

Summary of LTFs

<i>Site</i>	<i>Alternative</i>					<i>Type</i>
	1	2	3	4	5	
Cape Pole		X	X	X	X	A-frame
Edna Bay		X			X	A-frame
Nichen Cove		X	X	X	X	A-frame
West Orr					X	Slide

Issue 8 – Opportunity to Enhance Recreation Potential

General Consequences

Removal of Old-growth Forest Vegetation in Dispersed Recreation Areas

Dispersed recreation use such as hiking, hunting and fishing is most concentrated in the vicinity of protected waterways, anchorages and roads and extends into the forested areas where topography and vegetation permit foot travel. Generally, old-growth timber and muskeg are preferred over second-growth as foot travel corridors for hiking, hunting and other foot travel oriented activities because they offer relatively easy walking. After timber harvest operations, foot access through the second growth is often more difficult due to the heavy brush, young trees, and slash which are present until about 50 years after harvest.

Road Construction, Timber Harvest and the Spectrum of Recreation Opportunities

Under Alternatives 2 through 5, roads would be constructed to harvest timber which would be available to recreationists for driving and walking. Most of these would be spur roads which are located within areas which are already intensely roaded and they will not offer access to any new, high value recreation areas. No new areas will be roaded and there will be little change to the current Recreation Opportunity Spectrum (ROS) class distribution.

Tenass/Brockman/Marble Pass Area

In all alternatives, except Alternatives 1 and 5, the Tenass/Brockman/Marble Pass area would be managed with an emphasis on primitive recreation (ROS Class semi-primitive/non-motorized) and a marine accessible three-sided shelter would be constructed in this area as funding permits. To retain the primitive qualities of the area, special management direction would be implemented which would guide future developments. This approach would ensure that a range of recreation opportunities would be retained within the study area and provide an overnight recreation facility on the protected inside waters off northwest Prince of Wales Island.

Anchorage

No harvest or other activity is scheduled which would affect anchorages displayed on the alternative maps. Specific management direction would be established to retain the protection from the wind and the scenic and recreation values provided by these anchorages.

Dispersed Recreation Sites

No timber harvest is scheduled around dispersed recreation sites identified during the scoping process. These sites are displayed on the alternative maps and will receive consideration in planning future activities in the area. No developments are planned at these sites other than the Tenass/Brockman/Marble Pass shelter described above.

Specific Consequences

Alternative 1

Under the No Action alternative, recreation planning would continue on a case-by-case basis which may result in a lack of continuity in the recreation program. No special recreation management direction would be established for the Tenass/Brockman/Marble Pass area and no shelter would be constructed.

Alternative 2

Timber harvest would be concentrated around existing road systems and previously harvested areas and there would be little change in areas that are now unroaded and primitive. The Recreational Opportunity Spectrum for North Sea Otter Sound would remain essentially unchanged. The primitive character of Tenass/Brockman/Marble Passages (ROS Semi-Primitive/non-motorized) would be retained.

Alternative 3

Timber harvest planned under this alternative would be located in areas with past concentrated timber harvest, resulting in little change to the current Recreation Opportunity Spectrum. The primitive character of the Tenass/Brockman/Marble Pass (ROS Semi-Primitive/non-motorized) would be retained.

Alternative 4

The A-frame harvest units located in Marble Passage would change the primitive character of that portion of the Tenass/Brockman/Marble Pass area to ROS class Roaded Natural until these units return to a natural appearing condition about 50 years after harvest. The core area of Tenass/Brockman/Marble Passages would remain unchanged, however, and a shelter would be constructed as described above. The remaining harvest under this alternative would be located adjacent to areas that have already been heavily harvested and would result in little change to the ROS.

Alternative 5

The harvest planned under Alternative 5 would primarily occur in areas already heavily modified by previous logging. In these areas the Recreation Opportunity Spectrum would remain Roaded Modified.

In the Tenass/Brockman/Marble Pass area, concentrated A-frame logging would change the setting from primitive, backcountry recreation in a natural setting to a modified setting. This level of harvest would preclude management for primitive recreation values under this alternative.

Cumulative Effects

The primary cumulative effect to recreation to be considered is the change to the spectrum of recreation opportunities. Past timber management practices have resulted in the construction of an extensive road system and pattern of timber harvest within the study area. These developments have resulted in a change in recreation opportunities from primitive activities in a natural setting to more developed, roaded recreation opportunities in a modified setting (ROS classes Roaded Natural and Roaded Modified) on approximately 70 percent of the study area.

Over the remaining 30 percent of the study area the recreation opportunities are semi-primitive in nature (ROS classes Semi-Primitive motorized and Semi-Primitive non-motorized). In these areas there may be the sights and sounds of other users and some visual evidence of timber harvest, though a high degree of the primitive qualities are maintained. There are no highly primitive areas in the study area (ROS class Primitive I & II).

Alternatives 2, 3 and 4 will result in little change to the existing Recreation Opportunity Spectrum because roads and harvest units are located within areas which are currently heavily modified (ROS class Roaded Modified). Alternative 5 will result in changes to the current recreation opportunity spectrum in Mt. Francis and Marble Passage where harvest will change the Recreation Opportunity Spectrum from Semi-Primitive to Roaded Modified over about 800 acres.

**Anticipated Future
Consequences
Through the Year
2040**

It is expected that recreation use, especially marine-oriented activities, will continue to grow steadily through this period. Assuming that a harvest level of 40 million board feet or 1,000 acres per decade is carried out through the year 2040, timber harvest during this period would remove approximately one-fifth of the remaining old-growth timber in the study area. Road systems would be expanded to facilitate this harvest which would change the recreation character of the areas they access from a primitive, backcountry setting to a Roaded Modified setting. The existing stands of second-growth timber will continue to mature through the period and the setting in these areas will change from a modified to a more natural setting (ROS class Roaded Modified to Roaded Natural).

Chapter 5

List of Preparers

Chapter 5

List of Preparers

The following individuals participated in the formulation and analysis of the alternatives and the subsequent preparation of the Draft and Final Environmental Impact Statements.

William Shoaf - Interdisciplinary Team Leader (Final)

BS (Mathematics), Juniata College - 1970
BS (Forestry), University of Connecticut - 1977
MS (Forestry), University of Connecticut - 1978
Thirteen years of USFS experience
Five years of systems analysis in private industry
Former logger/commercial fisherman

John Autrey - Cultural Resource Management (Final)

BS (Anthropology), University of Northern Colorado - 1973
MA (Anthropology), University of Northern Colorado - 1973
Seven years of USFS experience

Doreen Baichtal - Technical Support (Final)

BS (Animal Science), Washington State University - 1983
One year USFS experience

Geneen Granger - Writer/Editor/Macintosh desktop publisher (Final)

BA (Anthropology), University of California, Davis - 1973
MS (Library and Information Science), UC Berkeley - 1987
Two years USFS experience

Patricia C. Krosse - Soil Scientist (Final)

BS (Soil Science), Cal Poly State University, San Luis Obispo - 1987
Five years of USFS experience

Henry W. Newhouse - Fisheries Biologist (Final)

B.S. Fisheries Biology, Humboldt State University, 1972
Fisheries Biology, Graduate Studies, Humboldt State University
Seventeen years of USFS experience

Robert J. Dalrymple - Forester (Draft)

BS (Forest Management), Colorado State University - 1979

Nine years of USFS experience

J. Jill Dodgen - Wildlife Biologist (Draft)

BS (Wildlife/Fisheries Science), South Dakota State University - 1981

BS (Biology), South Dakota State University - 1981

Seven years of USFS experience

Barth T. Hamberg - Landscape Architect (Draft)

BS (Agricultural Economics), University of Vermont - 1980

MLA, Harvard University - 1984

Three years of USFS experience

Kenneth E. Holbrook - Fisheries Biologist (Draft)

BS (Fisheries Biology), Humboldt State University - 1976

Ten years USFS experience, five years additional fisheries experience

Donna Hollingsworth - Wildlife Biologist (Draft)

BS (Natural Resources, Wildlife Mgmt), Univ. of WI-Stevens Pt. - 1979

BS (Biology/Ecology Emphasis), Univ. of WI-Stevens Pt. - 1979

AS (Environmental Law Enforcement), Univ. of WI-Stevens Pt. - 1979

Nine years of USFS experience

Gary R. Lawton - Silviculturist (Draft)

BS (Forest Science), University of Wisconsin-Madison - 1975

Ten years of USFS experience

Connie G. Myers - Social Scientist (Draft)

BS (Natural Resources Management), Univ. of Tennessee-Martin - 1981

MS (Fisheries and Wildlife), Michigan State University - 1985

MA (Communication), Michigan State University - 1985

Two years of USFS experience

Daniel W. Torrence - Forester and Team Leader (Draft)

BS (Forestry), Michigan Technological University - 1978

Nine years of USFS experience

Jeri L. Wagner - Word Processing (Draft)

Two years of USFS experience

Chapter 6

Use of Public Comments

Chapter 6

Use of Public Comment

Within the broad framework of Forest planning, public input is one of five considerations in the decision-making process. Forest Service decisions are based on five factors: 1) the law, 2) technical information, 3) resource capability, 4) professional judgment and 5) public input. Public input enters into the decision-making process when there is room for interpretation in any of the first four factors, especially with regard to which uses will be emphasized.

In accordance with 40 CFR 1503.4, the comments on the Draft EIS were treated in the following ways:

- Comments offering technical corrections of pointing out inconsistencies have been used to review the final documents.
- Comments requesting clarification or comments resulting from misunderstanding of what was meant in the documents indicate areas where the DEIS needed clarification. Corrections were made, or the reason a correction was not made is explained in the Forest's response to the comments.
- Another type of comment questioned some part of the analysis. In some cases, the analysis was clarified, supplemented or modified. Where further analysis was not done, the reason was explained in the response to the comment.
- Another type of comment suggested changes in the DEIS direction or outputs. These comments expressing a differing preference for Forest Service management required careful consideration both from an individual standpoint well as a collective one. Where feasible and appropriate, management area direction on specific issues was changed in response to comments; however, some comments requesting changing in the DEIS did not result in any change. Please see Chapter 2, pages 8-9, for a list of modifications to Alternative 4 made as a result of public comments and additional field surveys.

The Forest Service received two letters from individuals and eight letters from public agencies. A copy of each is located in the Planning Record, located at the Forest Supervisor's Office, Federal Building, Ketchikan, AK.



Chapter 7

**List of Agencies,
Organizations, and
Persons to Whom
Copies of This Statement
Were Sent**

Chapter 7

List of Agencies, Organizations, and Persons to Whom Copies of This Statement Were Sent

Agencies

Alaska Dept. of Environmental Conservation
Alaska Dept. of Fish and Game
Alaska Dept. of Natural Resource
Alaska Dept. of Transportation
Alaska Division of Forestry
Alaska Office of Management & Budget
National Marine Fisheries Service
National Park Service
NOAA Ecology and Conservation Division
Southeast Regional Fish & Game Council
US Army Corp of Engineers
US Bureau of Indian Affairs
US DA Bureau of Mines
UD DA Forest Service, Alaska Region offices
US DI Bureau of Land Management
US Environmental Protection Agency, Anchorage
US Environmental Protection Agency, Seattle
US Fish & Wildlife Service
US Government Printing Office
US Office of Architectural and Environmental Preservation

Organizations

Alaska Seiners Association
Alaska Sports & Wildlife Club
Alaska Trollers Association
Alaska Women in Timber
Bloom Logging Company
C&F Logging
Citizens Advisory Commission
Edna Bay Fish & Game Advisory Committee
El Captitan Logging
Harbour Logging Co.
Klawock Fish & Game Advisory Committee
Louisiana Pacific Corporation
Mitkof Lumber Company
National Audubon Society
Sierra Club
Society of American Foresters
Southeast Alaska Conservation Council
Southeast Alaska Seine Boat Owners and Operators
Southern Southeast Regional Aquaculture Association
Sumner Strait Fish & Game Advisory Committee
Tongass Conservation Society
United Fishermen of Alaska
United SE Alaska Gillnetter Association, Ketchikan Div.
Whale Pass Homeowners Association
Wilderness Society

Individuals

Lisa Baldwin
Russ & Charlene Bartell
Barney Belk
Bert & Marietta Bergman
Michael & Valerie Brooks
Debra Carpenter
John Carpenter
Don Cornelius
Jan & Carolyn Crane
Paul Cummings

Al Dennis
David DeRuwe
John & Jackie Eilertsen
Harold & Bobbi Ganong
Sylvia Geraghty
Gretchen Goldstein
Hon. Peter Goll
Von Helmuth
L.A. Jacobson
Tom Jacobson
Gayle Larson
Lawrence Larson
Willis Lebo Jr.
Lance & Sherrie Methie
Rob & Lois Morgan
Ed Mura
Gene Nelson
Dave & Teresa Ott
Robert Oyler
Bill Richter
Mark & Terri Richter
Pat & Angela Richter
Jack Rodgers
Pat Rowland
Henry & Carol Saundie
Joe Sebastian
George Shapley
Don & Judy Slatery
Bob & Marylou Smart
Cheryl and Mike Sullivan
Rep. Robin Taylor
Mike Tolsen
George & Carol Wallace
Bruce Wanstall
Steve & Chris Warren
Joseph Weyhmiller
Steve & Georgia Williams
Jenny & Sharon Woodmire
Dave & Susanne Woody
Elmo Wortman

Chapter 8

Glossary

Abbreviations and Acronyms

Chapter 8

Glossary

Abbreviations and Acronyms

Allowable Sale Quantity (ASQ)	The maximum harvest volume that may be scheduled during the plan period to meet long-term production while providing for other resource objectives.
Alpine	Alpine refers to parts of mountains above tree growth or to organisms living there.
Anadromous fish	Fish which mature and spend much of their adult life in the ocean, returning to inland waters to spawn. Salmon and steelhead are examples.
Best Management Practices (BMPs)	The set of practices which, when applied during implementation of a project ensures that water-related beneficial uses are protected and that State Water Quality Standards are met.
Board foot	A measurement of timber volume equal to a board sawn to a dimension of 12 x 12 x 1 inch.
Channel type	A means of distinguishing parts of a stream system into segments which have fairly consistent physical and biological characteristics.
Clearcut	Harvesting method in which all trees are cleared in one cut. It prepares the area for a new, even-aged stand.
Commercial forest land	Land capable of producing industrial wood in excess of 20 cubic feet per acre of annual growth.
Developed recreation sites	Recreation areas with developed facilities such as cabins, shelters and trails. Usually receive regular use.
Dispersed recreation sites	Recreation areas that receive periodic recreation use, but are without developed recreation facilities. Includes beach camping sites, scenic attractions, popular hunting areas, etc.

Ecosystem	A complete, interacting system of organisms considered together with their environment (for example: a marsh, a watershed, or a lake).
Estuary	The part of the mouth or lower course of a river in which the river's current meets the sea's tide, or an arm or inlet of the sea at the lower end of a river.
Extended rotation	An extension of the timber harvest rotation providing additional latitude in the design of harvest units in visually sensitive areas.
Fluting	Condition in hemlock trees characterized by irregular trunk shapes where longitudinal ridges and grooves spiral upward. Fluted stems are less desirable from a timber production perspective.
Forest Plan	Source of management direction for an individual Forest specifying activity and output levels for a period of 10-15 years. Management direction in the plan is based on the issues identified at the time of the plan's development.
Land Use Designation (LUD)	General management prescriptions applied to a Value Comparison Unit or group of Value Comparison Units. These land use designations are as follows:
<i>LUD 1</i>	Forest Service recommended Wilderness areas are managed for solitude and primitive types of recreation.
<i>LUD 2</i>	Lands under this designation are managed in a roadless state to retain their wildland character.
<i>LUD 3</i>	These lands are managed for a variety of uses. The emphasis is on managing for both amenity and commodity oriented uses in a compatible manner to provide the greatest combination of benefits.
<i>LUD 4</i>	These lands are managed to provide opportunities for intensive development of resources. Emphasis is primarily on commodity, or market resources and their use.
Large organic debris (LOD)	Any large piece or relatively stable woody material in a stream or river, having a diameter of four inches or greater and a length greater than three feet, that intrudes into a stream channel.
Log transfer facility (LTF)	Formerly referred to as Terminal Transfer Facilities, Log Transfer Facilities include the industrial site and facilities (structure) used for moving logs and timber products from land-based transportation forms to water-based transportation forms.
Manager indicator species (MIS)	Species selected in a planning process that are used to monitor the effects of planned management activities on viable populations of wildlife and fish, including those that are socially or economically important.
Mitigate	To lessen or make minimal the severity.
Recreation Opportunity Spectrum	A system for planning and managing recreation resources that categorizes recreation opportunities into seven classes:
<i>Primitive</i>	A natural environment of fairly large size. Interaction between users is very low, and evidence of other users is minimal.
<i>Semi-Primitive Motorized</i>	A natural or natural-appearing environment of moderate to large size. Interaction between users is low, but there is often evidence of other users.

<i>Semi-Primitive Non-Motorized</i>	A natural or natural-appearing environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. The area is managed to minimize onsite controls and restrictions.
<i>Roaded Natural</i>	A natural-appearing environment with moderate evidence of the sights and sounds of humans. Such evidence usually harmonized with the natural environment. Interaction between users may be moderate to high with evidence of other users prevalent. Motorized use is allowed.
<i>Roaded Modified</i>	A natural environment that has been substantially modified particularly by vegetative manipulation. There is strong evidence of roads and/or highways. Frequency of contact is low to moderate.
<i>Rural</i>	A natural environment that has been substantially modified by development of structures, vegetative manipulation. Structures are readily apparent and may range from scattered to small dominant clusters. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high.
Second growth	Forest growth that has come up naturally or has been planted after some drastic interference (for example, clearcut harvest, serious fire, or insect attack) with the previous forest growth.
Sensitivity level	A measure of the people's concern for the scenic quality of the National Forest applied to travel routes, use areas, and water bodies.
Site index	The height to which a tree will grow under forest conditions in 100 years for most old-growth Western species.
Snag	A standing dead tree usually greater than 5 feet tall and 6 inches in diameter at breast height.
Soil site index	Site quality within a given macroclimate is associated with the soils capacity to provide moisture and nutrients.
Stream class	A means to categorize stream channels based on their fish production values. There are three stream classes on the Tongass National Forest:
<i>Class I</i>	Streams with anadromous fish or adfluvial lake and stream fish habitat.
<i>Class II</i>	Streams with resident fish populations and generally steep gradient. These populations have limited sport fisheries values.
<i>Class III</i>	Streams with no fish populations but have potential water quality influence on the downstream aquatic habitat.
Thinning	The practice of removing some of the trees in a stand so that the remaining trees will grow faster due to reduced competition for nutrients, water, and sunlight. Thinning may be done at two different stages:
<i>Precommercial thinning</i>	Removing trees that are too small to make a merchantable product to improve tree spacing and promote more rapid growth.
<i>Commercial thinning</i>	Removing trees that have reached sufficient size to be manufactured into a product to improve tree spacing and promote more rapid growth.

Value Comparison Unit (VCU)	A distinct geographic area that generally encompasses a drainage basin containing one or more large stream systems. Boundaries usually follow easily recognizable watershed divides.
Visual Quality Objective	A desired level of scenic quality and diversity of natural features based on physical and sociological characteristics of an area. Refers to the degree of acceptable alterations of the characteristic landscape.
<i>Preservation</i>	Management activities are generally not allowed in this setting. The landscape is allowed to evolve naturally.
<i>Retention</i>	Management activities are not evident to the casual Forest visitor.
<i>Partial Retention</i>	Management activities may be evident, but are subordinate to the characteristic landscape.
<i>Modification</i>	Management activities may dominate the characteristic landscape but will, at the same time, use naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed as middleground (1/4 to 5 miles from viewer).
<i>Maximum Modification</i>	Management activities may dominate the characteristic landscape, but should appear as a natural occurrence when viewed as background.
Volume class 4	Commercial forest land containing from 8 to 20 MBF per acre. A midrange value at 14 MBF/acre was used for calculations within this document.
Volume class 5	Commercial forest land containing 20 to 30 MBF per acre. A midrange value of 25 MBF/acre was used for calculations within this document.
Volume class 6	Commercial forest land containing from 30 to 50 MBF per acre. A midrange value of 40 MBF/acre was used for calculations within this document.
Volume class 7	Commercial forest land containing 50 MBF or more per acre. A value of 50 MBF/acre was used for calculations within this document.

Abbreviations and Acronyms

ACMP	Alaska Coastal Management Program
ADF&G	Alaska Department of Fish and Game
AHMU	Aquatic Habitat Management Unit
ANILCA	Alaska National Interest Lands Conservation Act
ASQ	Allowable Sale Quantity
BD. FT.	Board foot
BMP	Best Management Practice
CFL	Commercial Forest Land
EIS	Environmental Impact Statement
FEIS	Final Environmental Impact Statement
KPC	Ketchikan Pulp Company
LOD	Large Organic Debris
LTF	Log Transfer Facility
LUD	Land Use Designation
MBF	Thousand Board Feet
MIS	Management Indicator Species
MMBF	Million Board Feet
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
ROS	Recreation Opportunity Spectrum
SBA	Small Business Administration
TLMP	Tongass Land Management Plan
TRUCS	Tongass Resource Use Cooperative Survey
TSPIRS	Timber Sale Program Information Reporting System
USDA FS	United States Department of Agriculture.Forest Service
VCU	Value Comparison Unit
VQO	Visual Quality Objective
WHMU	Wildlife Habitat Management Unit

Chapter 9

References

Chapter 9

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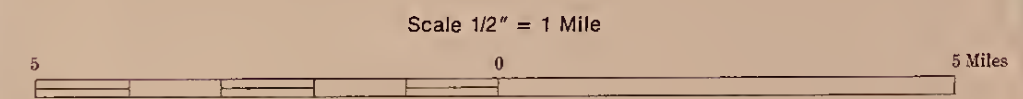
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LEGEND

- VALUE COMPARISON UNIT BOUNDARY
- [Pattern] NOT INCLUDED IN STUDY AREA
- [Green] EXISTING SECOND-GROWTH
- [Brown] PROPOSED TIMBER HARVEST UNIT
- [Orange] AREAS THAT WILL BE MANAGED TO PROVIDE OLD-GROWTH HABITAT CONDITIONS
- [Red] EXTENDED ROTATION
- EXISTING ROAD
- PROPOSED ROAD
- CLASS 1 AQUATIC HABITAT MANAGEMENT UNIT
- CLASS 2 OR 3 AQUATIC HABITAT MANAGEMENT UNIT
- DISPERSED RECREATION SITE/
POTENTIAL DEVELOPED RECREATION SITE
- FOREST SERVICE RECREATION CABIN
- ★ ANCHORAGE SITE
- ≡ EXISTING LOG TRANSFER FACILITY
- 5 PROPOSED HARVEST UNIT NUMBER
- [Pattern] NON NATIONAL FOREST LANDS



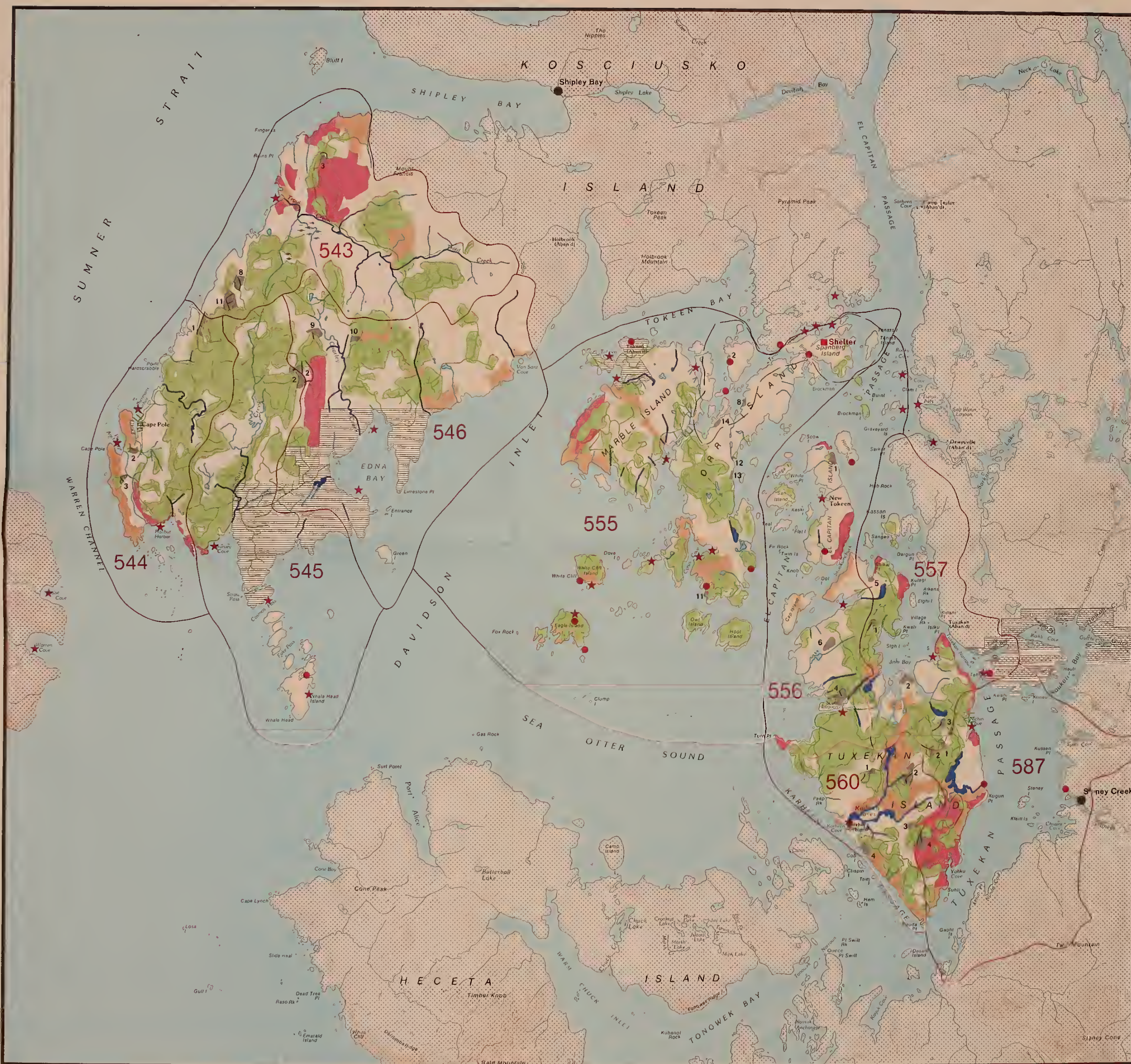
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
TONGASS NATIONAL FOREST

NORTH SEA OTTER SOUND FINAL EIS

VALUE COMPARISON UNITS

543	544	545	546	555
556	557.02	560	587.21	

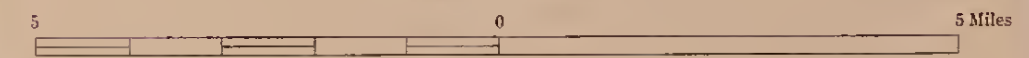
ALTERNATIVE 5



LEGEND

- VALUE COMPARISON UNIT BOUNDARY
- NOT INCLUDED IN STUDY AREA
- EXISTING SECOND-GROWTH
- PROPOSED TIMBER HARVEST UNIT
- AREAS THAT WILL BE MANAGED TO PROVIDE OLD-GROWTH HABITAT CONDITIONS
- EXTENDED ROTATION
- EXISTING ROAD
- PROPOSED ROAD
- CLASS 1 AQUATIC HABITAT MANAGEMENT UNIT
- CLASS 2 OR 3 AQUATIC HABITAT MANAGEMENT UNIT
- BROCKMAN/TENASS/MARBLE RECREATION MANAGEMENT AREA
- DISPERSED RECREATION SITE/ POTENTIAL DEVELOPED RECREATION SITE
- FOREST SERVICE RECREATION CABIN
- ANCHORAGE SITE
- EXISTING LOG TRANSFER FACILITY
- PROPOSED HARVEST UNIT NUMBER
- NON NATIONAL FOREST LANDS

Scale 1/2" = 1 Mile



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VALUE COMPARISON UNITS

543	544	545	546	555
556	557.02	560	587.21	

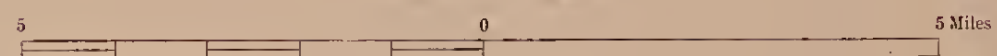
ALTERNATIVE 4



LEGEND

- VALUE COMPARISON UNIT BOUNDARY
- NOT INCLUDED IN STUDY AREA
- EXISTING SECOND-GROWTH
- EXISTING ROAD
- FOREST SERVICE RECREATION CABIN
- EXISTING LOG TRANSFER FACILITY
- NON NATIONAL FOREST LANDS

Scale 1/2" = 1 Mile



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VALUE COMPARISON UNITS

543	544	545	546	555
556	557.02	560	587.21	

ALTERNATIVE 1

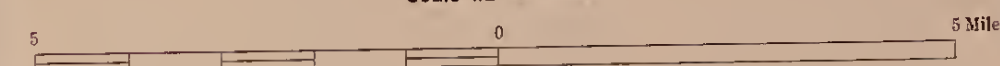




LEGEND

- VALUE COMPARISON UNIT BOUNDARY
- [Pattern] NOT INCLUDED IN STUDY AREA
- [Green] EXISTING SECOND-GROWTH
- [Brown] PROPOSED TIMBER HARVEST UNIT
- [Orange] AREAS THAT WILL BE MANAGED TO PROVIDE OLD-GROWTH HABITAT CONDITIONS
- [Red] EXTENDED ROTATION
- EXISTING ROAD
- PROPOSED ROAD
- CLASS 1 AQUATIC HABITAT MANAGEMENT UNIT
- CLASS 2 OR 3 AQUATIC HABITAT MANAGEMENT UNIT
- BROCKMAN/TENASS/MARBLE RECREATION MANAGEMENT AREA
- [Red Dot] DISPERSED RECREATION SITE/
POTENTIAL DEVELOPED RECREATION SITE
- [Black Dot] FOREST SERVICE RECREATION CABIN
- [Star] ANCHORAGE SITE
- [Symbol] EXISTING LOG TRANSFER FACILITY
- [S] PROPOSED HARVEST UNIT NUMBER
- [Pattern] NON NATIONAL FOREST LANDS

Scale 1/2" = 1 Mile



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VALUE COMPARISON UNITS
543 544 545 546 555
556 557.02 560 587.21

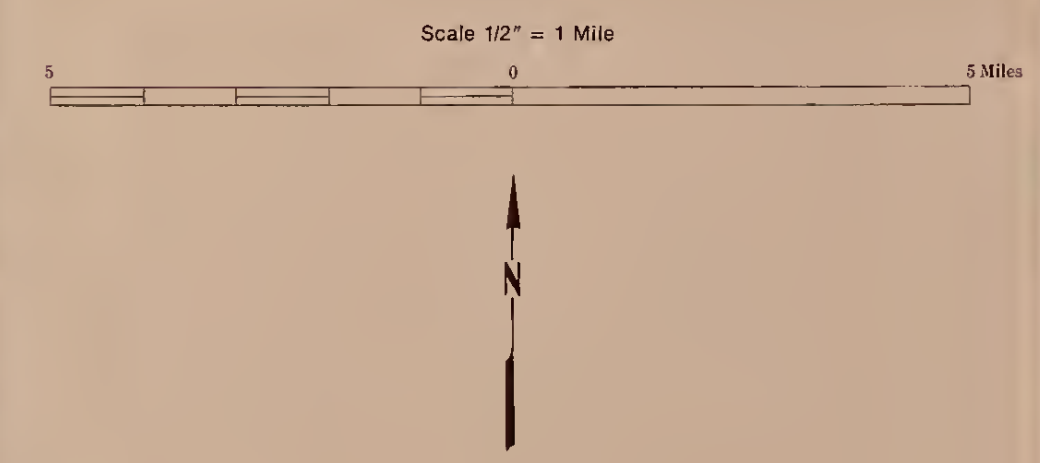
ALTERNATIVE 2





LEGEND

- VALUE COMPARISON UNIT BOUNDARY
- NOT INCLUDED IN STUDY AREA
- EXISTING SECOND-GROWTH
- PROPOSED TIMBER HARVEST UNIT
- AREAS THAT WILL BE MANAGED TO PROVIDE OLD-GROWTH HABITAT CONDITIONS
- EXTENDED ROTATION
- EXISTING ROAD
- PROPOSED ROAD
- RESIDENT FISH HABITAT PROTECTION BUFFER
- ANADROMOUS FISH HABITAT PROTECTION BUFFER
- BROCKMAN/TENASS/MARBLE RECREATION MANAGEMENT AREA
- DISPERSED RECREATION SITE/
POTENTIAL DEVELOPED RECREATION SITE
- FOREST SERVICE RECREATION CABIN
- ★ ANCHORAGE SITE
- U EXISTING LOG TRANSFER FACILITY
- 5 PROPOSED HARVEST UNIT NUMBER
- NON NATIONAL FOREST LANDS



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VALUE COMPARISON UNITS

543	544	545	546	555
556	557.02	560	587.21	

ALTERNATIVE 3

